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a cross analytical approach based on aeromobilities

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BY
JENS HUNDEVAD BLOCH

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AALBORG UNIVERSITY
DENMARK

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Industrial PhD thesis – Aalborg University and Copenhagen Airports A/S

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CV

On my 18th birthday, my mother gave me an old aluminum propeller from an aircraft – it was the best birthday present ever. It represents a combination of hardcore technical development but also the elegance of flying. Both in my personal and professional life all parts of aviation have always fascinated me. During my studies at Copenhagen Business School, first as a bachelor student in Business Administration (HA-almen) I wrote my bachelor thesis about Copenhagen Airport, and later as master student in Strategic and Financial Management (cand.merc.FSM) I wrote again about Copenhagen Airport in my final thesis. These two project gave me insights into some of the academic literature about aviation. During my final years as a student, I went for a job interview in Copenhagen Airport within an analytical department. It sounded interesting and I was very keen on getting the job. On my way to the interview, I passed through the landside terminals of Copenhagen Airport where passengers were lined up for check-in. The atmosphere here – the feeling we all experience when going on new adventures – combined with the professional possibilities to be part of this environment only boosted my enthusiasm concerning aviation. During years of working in Copenhagen Airport, this fascination has only increased.

My first employment at Copenhagen Airport was as analyst in the aviation department working on the regulatory charge negotiations between the airport and airlines. Later I worked as Senior Financial analyst with focus on risk assessment, long-term financial impact of investments and charge negotiations. These aspects of aviation provided extensive insight into the financial side of aviation infrastructure.

In early 2015, I had the opportunity to start this Industrial PhD with a focus on the development of hub airports across Europe. This possibility gave me a chance to develop another dimension of the fascination of aviation: what drives the development of aviation. In contrast to my previous field of expertise, this PhD gave me the possibility to dive in to a new academic field, which has opened a new and captivating dimension of aviation.

ENGLISH SUMMARY

This PhD thesis provides a contribution to the understanding of hub airports based on an aeromobilities perspective. The research project is founded on four international case studies of European hub airports, where I have developed an understanding of the driving forces within society for developing successful hub airports. These findings will help to develop strategies for Copenhagen Airport to increase connectivities for the benefit of the Danish society. The thesis is grounded in a challenging situation for Copenhagen Airport, where its hub function has decreased for decades, challenging the global reach for Denmark.

In addition, this thesis contributes to the development of the research field: Aeromobilities, which has a wider societal perspective on aviation. Currently, the conventional aviation research is mostly based on a quantitative perspective for understanding the drivers of aviation; however, by having this aeromobilities approach based on quantitative methods, the research is able to complement the conventional research by unfolding the underlying discourses and rationalities of the making of hub airports. Based on this I have outlined the following main research question:

> *What are the driving forces, mechanism, discourses and rationalities that are associated with the development of selected European hub airports and upon evaluation of these, and what can be learned in the Danish context in relation to aviation policies and governance? Consequently, the ambition is to achieve a theoretical and empirical understanding of hub airports' development potential, and based on this, to assess the relationship between the Danish context and Copenhagen Airport.*

In order to address the above question, I have outlined three underlying questions for which the answers will unfold the answer to the main question.

1. *How can a hub airport theoretically and methodologically be understood and investigated?*
2. *What are the driving mechanisms and patterns of meaning behind the production of aeromobilities at selected European hub airports?*
3. *In a Danish context, what can be learned from the study of the selected European hub airports?*

Structure of the thesis

Part 1 (chapter 1-3) This part contains the introduction and motivation for this PhD thesis. The historical development of aviation is described. Further, it is elaborated

how aviation and airports are researched within the conventional aviation approach. Lastly, aeromobilities are unfolded in order to understand and research aviation and airports in a wider context, where airports can be understood as a strategical node for the global flows of ideas, people and culture.

Part 2 (chapter 4-6) I will argue for a foundation for aeromobilities based on the meta-theoretical position of critical realism where the research field is addressed as an open system. Such a position focuses on dynamic causalities along discourses, rationalities and meanings as essential for understanding the system. Based on this meta-theoretical position, the methodology of case studies are presented. Additional the theoretical framework of governance is introduced, and together with a set of theoretical lenses related to Policies and Materialities, the analytical framework for this thesis is developed.

Part 3 (Chapter 7-11) This part contains four case studies for the hub airports in Amsterdam, Helsinki, Brussels and Zurich. Based on quantitative analysis of the traffic system, the qualitative analysis focuses on the driving forces within the system through the analytical framework in order to identify dynamic causalities, discourses and underlying rationalities. During these analyses, elements are highlighted which are relevant for developing an airport governance model. Finally, the four cases are analyzed across, and four themes are identified as foundation for the production of hub airports.

Part 4 (Chapter 12) This part covers the case of Copenhagen Airport. First an analysis of the airport based on the analytical framework, and lastly a perspective on these findings in relation to the themes identified in the cross case analysis of the four case airports.

Part 5 (Chapter 13-15) Here are the overall conclusions to the main research question and the three underlying questions presented. The answers are summarized in 11 findings, which consist of three theoretical findings, then four empirical findings and lastly four key findings in relation to Copenhagen Airport. Further, in the last chapters: thoughts on alternative approaches to Copenhagen Airport as a hub are articulated along suggestions for further research themes.

DANSK RESUME

Denne ph.d. afhandling er et bidrag til forståelsen af hub lufthavne baseret på et aeromobilities perspektiv. Forskningsprojektet er baseret på fire internationale case studier af europæiske hub lufthavne, hvor jeg har udviklet en forståelse af samfundets drivende kræfter for at udvikle succesfulde hub lufthavne. Disse resultater vil bidrage til, at udvikle strategier for Københavns Lufthavn til at øge dennes tilgængelighed til gavn for det danske samfund. Afhandlingen fokuserer på en udfordrende situation for Københavns Lufthavn, hvor dennes hub funktion er faldet i årtier og dermed udfordrer den globale rækkevidde for Danmark.

Desuden bidrager denne afhandling til udviklingen af forskningsområdet: Aeromobilities, som har et bredere samfundsperspektiv på luftfart. For nuværende er den konventionelle luftfartsforskning hovedsagelig, baseret på et kvantitativt perspektiv i forståelsen af luftfartens drivkrafter. Ved at anvende en sådan aeromobilities tilgang baseret på kvalitative metoder kan forskningen komplementere den konventionelle forskning ved, at udfolde de underliggende diskurser og rationaler i skabelsen af hub lufthavne.

På baggrund af dette har jeg opstillet følgende hovedforskningsspørgsmål:

> *Hvilke drivkræfter, mekanismer, diskurser og rationaler er der forbundet med udviklingen af udvalgte europæiske hub-lufthavne og efter evaluering af disse, hvad kan der læres i dansk sammenhæng i forhold til luftfartspolitik og governance? Ambitionen er, at opnå en teoretisk og empirisk forståelse af hub-lufthavnes udviklings potentiale, og baseret på disse vurdere forholdet mellem den danske kontekst og Københavns Lufthavn.*

For at imødegå ovennævnte spørgsmål har jeg skitseret tre underliggende spørgsmål, for hvilke svarene vil udfolde svaret på hovedspørgsmålet.

1. Hvordan kan en hub-lufthavn teoretisk og metodologisk forstås og undersøges?
2. Hvad er drivmekanismerne og mønstrene bag produktionen af aeromobilities i udvalgte europæiske hub-lufthavne?
3. Hvad kan man lære af undersøgelsen af de udvalgte europæiske hub-lufthavne i forhold til den danske kontekst?

Afhandlingens opbygning
Del 1 (kapitel 1-3) Denne del indeholder introduktionen og motivationen til denne ph.d.-afhandling. Den historiske udvikling af luftfart er beskrevet. Dertil vises der hvordan der konventionelt forskes i lufthavne og luftfart. Endelig udfoldes

aeromobilities som en tilgang til at forstå og undersøge luftfart og lufthavne i en bredere kontekst, hvor lufthavne kan forstås som et strategisk knudepunkt for globale strømme af ideer, mennesker og kultur.

Del 2 (kapitel 4-6) Jeg vil argumentere for et fundament for aeromobilities tilgang baseret på den meta-teoretiske position af kritisk realisme, hvor forskningsfeltet behandles som et åbent system. En sådan holdning fokuserer på dynamiske kausalitet sammenholdt med rationaler og meninger der er afgørende for forståelsen af systemet. Baseret på denne meta-teoretiske position er metodologien for casestudier præsenteret. Derudover introduceres den teoretiske forståelses af governance, og med et sæt teoretiske linser relateret til Politikker og Materialitet udvikles den analytiske ramme for denne afhandling.

Del 3 (Kapitel 7-11) Denne del indeholder fire casestudier af hub-lufthavne i henholdsvis Amsterdam, Helsinki, Bruxelles og Zürich. Baseret på en kvantitativ analyse af trafiksystemet, fokuserer den kvalitative analyse på drivkræfterne i systemet gennem den analytiske ramme for at identificere dynamiske kausalitet, diskurser og underliggende rationaler. I løbet af denne analyse fremhæves elementer, der er relevante for udviklingen af en fremtidig governance model for hub-lufthavne. Endelig analyseres de fire cases på tværs, og fire temaer bliver identificeret som grundlag for produktionen af hub lufthavne.

Del 4 (Kapitel 12) Denne omhandler casen, Københavns Lufthavn. Først en analyse af lufthavnen baseret på den analytiske ramme og endelig et perspektiv på resultaterne heraf sammenholdt med de temaer, der blev identificeret i den tværgående case analyse af de fire case lufthavne.

Del 5 (Kapitel 13-15) Her præsenteres de overordnede konklusioner for hovedforskningsspørgsmålet og de tre underliggende spørgsmål. Svarene er opsummeret i 11 fund, der består af tre teoretiske fund, derefter fire empiriske fund og endelig fire fund i forhold til Københavns Lufthavn. Endvidere formuleres der i de sidste kapitler tanker om alternative tilgange til Københavns Lufthavn som et hub, sammen med forslag til yderligere forskningstemaer.

PREFACE

This PhD project has been a very long journey! On one hand, it has been an outstanding opportunity to have the time to conduct research with support and insights from some of the best academics and professionals. On the other hand, the academic field of research – which was new to me – did challenge me a lot. My background as a financial analyst focusing on financial performance and business cases has always kept me thinking in quantitative ways. Situations where colleagues used qualitative arguments for promoting new ideas often received this response: "*C'mon, show me the money*". This quantitative way of perceiving the world was confronted with John Urry's arguments of different kinds of mobilities or Cresswell's distribution of power. Their rationalities and approach to the world were often miles away from my conventional way of thinking. Along the way, my understanding of the world has been expanded to understand their way of thinking and approach to research, but it has also caused me a lot of long nights filled with wonder, frustrations and reflections. My financial background together with my mobilities lenses have offered me two different perspectives, which are still fighting and supplementing each other – sometimes for the better, other times for the worse. Disregarding these drawbacks, the journey has been outstanding and the experience of a lifetime.

This journey and project would not have been possible without support and aid from people around me.

First and foremost my wife, Mille, who has been very supportive, encouraging and helpful in her approach to this project which has taken up almost all of my professional and personal time. During the years, she has upheld the family life and our three children: Hubert, Ingrid and Wilder, during my travels for my case studies, conferences, during the travels to my university in Aalborg and the final year of writing up this thesis. Without her support, love and smiles, it would NOT have been possible to conduct this research program. In addition, I would like to thank especially my sister, Stine and my mother, Janne for tremendous support in the final phase of this project – without their encouragements the project would not have been completed.

Furthermore, I would like to thank my supervisory from Aalborg University: Claus Lassen and Ole B. Jensen. First, for taking the chance to take me onboard regarding this project and secondly for their consistently positive and constructive approach to all my questions and considerations. During long talks whether it was early morning, late evening or across Europe, they have been supportive, and challenged me and pushed my perceptions and understandings. Additional, I would also like to thank all my colleagues at Aalborg University, who have helped me throughout the years. It has been outstanding.

An important stakeholder in this project has been Copenhagen Airports A/S. I would like to acknowledge former and current colleagues who believed in the project and me. Thomas Thessen, Chief Traffic Forecaster at Copenhagen Airport, has been tremendous support during all the years. The project would never have been a possibility if the airport had not been willing to support the effort in various ways. In addition to this, I would like to say thank you to my supporting group consisting of various industrial stakeholders. During multiple meetings where I have presented different findings, they have initiated fruitful discussions and dialogs based on real life considerations and perspectives.

Further, this project would not have been possible without financial support from Innovation Fund Denmark, The Capital Region of Denmark, Copenhagen Connected, Danish Metalworkers' Union, United Federation of Danish Workers and Confederation of Danish Industry.

Finally, I would like to acknowledge all the people across Europe whom I have interviewed. I am amazed by their willingness to contribute to my project. It has been very interesting to interview all these very professional persons. Their willingness to use time and expertise to help me understand the different contexts in which the production of aeromobilities takes place in their regions has been irreplaceable.

Thanks!

INFORMATION FOR THE READERS

Conflict of interests:
This PhD research project is an Industrial PhD, which takes place in cooperation between Aalborg University and Copenhagen Airports A/S.
As stated in my CV, I have worked in Copenhagen Airports A/S for several years prior to this project. Due to the Industrial PhD, Copenhagen Airports A/S employs me during the research project, and after the project I will continue to work in the airport. Due to this relationship, a conflict of interest could compromise or cause an analytical bias both positive and negatively in relation to the project and recommendations. However, I have tried my best to balance my views and I have had critical dialogs with my supervisors regarding these perspectives.

Regarding Chapter 8 Case – Helsinki:
Please note this Chapter 8 is based on the article: "An understanding of how aviation is handled in Helsinki and Finland", which is written by me and Claus Lassen in 2016. The article was presented at *Traffic Days at Aalborg University*[1] in 2016. Further, the article was reviewed and accepted in the proceedings from the conference.
Text parts in Chapter 8 that are direct copy from the article; these parts are marked with " " and a footnote stating: "This is [*text*] is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016)"
Other parts are rewritten based on parts from the article. These parts are not directly quotes and therefore, these will be marked with a footnote stating the following including a comments on what have been changed or updated: "This [*text*] draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with:[*text*] (Bloch & Lassen, 2016)"
Tables and figure used in this thesis, that are direct copy will have a source stating: (Bloch & Lassen, 2016)

Reading information:
In this thesis, I have used APA as writing style and format. A part of this format, quotations with more than of 40 words should be as freestanding block, while quotations less than 40 words should be included in the text. However, some quotations less the 40 words will be free standing blocks to illustrate the importance of these.

[1] Own translation of: "*Trafikdage på Aalborg Universitet*"

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1 INTRODUCTION AND MOTIVATION

> *"Globalization lands on the runways of the international airport hubs – but is also takes off from them. Air travel largely defines the transnational time and mobility regimes of world society" (Kesselring, 2009, p. 41)*

The world consists of movements in different forms and scales. Ranging from short distance movements of peoples, goods and ideas to large global movements. Some movements takes place daily, while others less often. Aviation is part of these movements and produces the potential for the global to connect in new ways that have accelerated since WWII. A survey finds that international travel from Denmark, cars are the dominate transport mode for distances less than 500 km, while for travel distances larger than 2.000 km, aircrafts are by far the most used mode of travel. For distances between 500 km and 2.000 km cars, public transportation and aircrafts are used at different levels (Christensen, 2016, p. 857). This illustrates how important aviation is for the global coherence.

Historically, there has been a research tradition based on a '*predict and provide'* approach, where the development of aviation is understood as a mechanical process based on market forces or geo-economic variables. In this thesis, I will argue for, that the production of aviation is more than just these mechanical processes. The development of aviation both in terms of airports and airlines is not developed evenly across the world and I will argue that aviation also is a consequence of policies spanned out in relation to different materialities. The aviation sector in Europe supports and generates up to 12.3 million jobs and 4.1% of the European GDP (ACI Europe, 2015b, p. VI), however the production of aviation does not come without cost e.g. significant capital investments, land use, noise externalities, pollution, potential mass tourism and risk of spreading diseases across the globe**.** In my thesis, I will therefore, based on my theoretical and empirical findings, further argue that in order to develop the foundation for the aviation sector at the expense of these externalities it does require strong political attention and willingness both in terms of time and capital.

International air connectivity is a key element for maintaining and developing nation's business environments and tourism and therefore is important for companies to have frequent connections to the world in order to meet customers and for the transport of goods (Goetz, 2015, p. 366). However, there are capacity constraints within the European aviation system (European Commission, 2015, p.15) and due to liberalization of European aviation market there are intense competition among airlines, and many airlines are struggling to keep up with changing business models,

and they are, year-by-year, initiating new cost saving programs. Consequently and due to different forms for corporatization of major European airports, the role of airports have changed in society, from being passive infrastructure with a focus on predominately on capacity, the airports are now an active part in developing new connectivities. The challenging and changing market for aviation is also applying to the Danish context and therefore this project is among other elements aiming to develop new approaches to address this situation. Instead of a primary focus on airline business models and market conditions, the focus will relate to an understanding of Policies and Materialities that have formed the current situation for the airport and the aviation setup in different European countries.

Such transforming process of aviation and airports challenges to some extent Copenhagen Airport and Danish society. Therefore, Copenhagen Airport is the focus carried out as this industrial PhD project.

The research questions driving this Ph.D. project will be based on a wondering of how European societies handle and relate to the development of hub airports, which are important drivers for regions and nations, with a focus on the following question:

> *What are the driving forces, mechanism, discourses and rationalities that are associated with the development of selected European hub airports and upon evaluation of these, and what can be learned in the Danish context in relation to aviation policies and governance? Consequently, the ambition is to achieve a theoretical and empirical understanding of hub airports' development potential, and based on this, to assess the relationship between the Danish context and Copenhagen Airport.*

This research question is the main question that I will answer through this thesis. In order to be able to address the above question, I have outlined three underlying questions for which the answers will unfold the solution to the main question.

1. *How can a hub airport theoretically and methodologically be understood and investigated?*

2. *What are the driving mechanisms and patterns of meaning behind the production of aeromobilities at selected European hub airports?*

3. *In a Danish context, what can be learned from the study of the selected European hub airports?*

I will investigate this by a case study with four cases of European hub airports that all have had significant developments in terms of numbers of passengers the last decades.

The research is based on interviews of a large range of stakeholders including representatives from airports, airlines and aviation authorities and aviation policies. This empirical data is analyzed through a set of lenses consisting of Policies and Materialities and particular with a focus on the identifying dynamic causalities, discourses and rationalities that drives the production of hub airports. After a cross case analysis of the four cases, I will use the same research approach to understand the production of aeromobilities[2] in Copenhagen Airport. Hereafter I analyze this case based on findings from the cross case analysis to develop recommendations for policies and governance of hub airports that can be implemented in the Danish context to maintain and develop Copenhagen Airport as a hub. Before I present the structure of the thesis, I will in the following look more into the context of the problem formulation. Such context represent a strong motive/driver for investigating such problem.

The challenge in Copenhagen Airport?

The context of this research is founded in the fact that Copenhagen Airport has had a challenging development the last decades, especially as its hub function the last decades has been deteriorating from a transfer ratio of more than 45% in 2000, the level of transfer passengers are in 2017 only around 20%. Disregard of the last years small fluctuations in actual number of transfer passengers, the overall development of the transfer passengers and therefore the hub function in Copenhagen Airport have been declining by 35%. Figure 1 illustrates the decrease in number of transfer passengers from 2000 and onwards - see also: (Lassen, Jensen & Larsen, 2017).

[2] The term Aeromobilities will be elaborate in Chapter: 3 Aeromobilities.

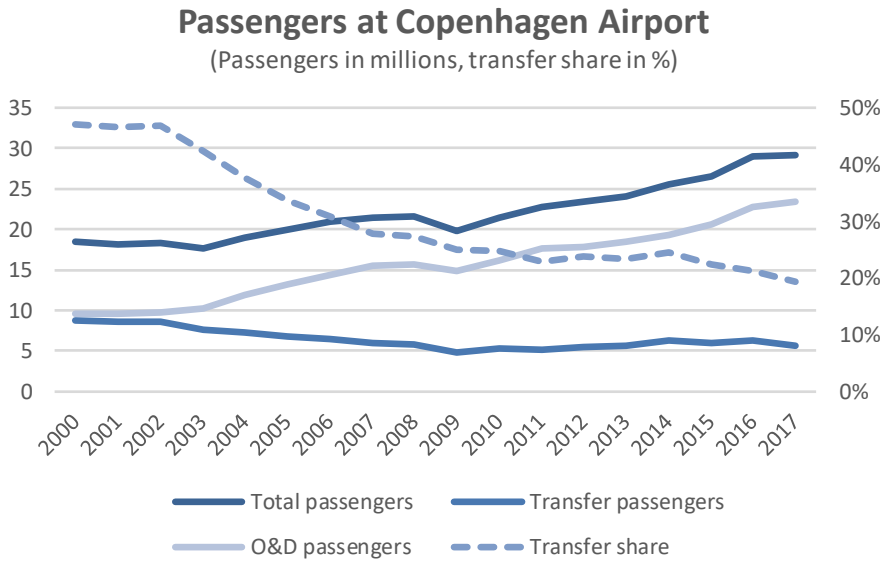

Figure 1: This illustrates the development in total passengers and transfer passengers in Copenhagen Airport. Since 2000 Copenhagen Airport has had a declining trend in transfer passengers from 8.8m in 2000 to 5.7m in 2017 (-35%), and transfer share decrease from 47% in 2000 to 19% in 2017. Note: Transfer passengers and the associated transfer share from 2000-2008 are based on estimates (CPH data).

This development of Copenhagen Airport as a hub airport is remarkable compared to Amsterdam Schiphol Airport[3] which had the same number of passengers in the late 80's and now is more than twice as big in number of passengers, which can be seen below.

[3] The official name for the largest airport in Amsterdam is Amsterdam Airport Schiphol. In this thesis, I will use the name Schiphol or Schiphol Airport.

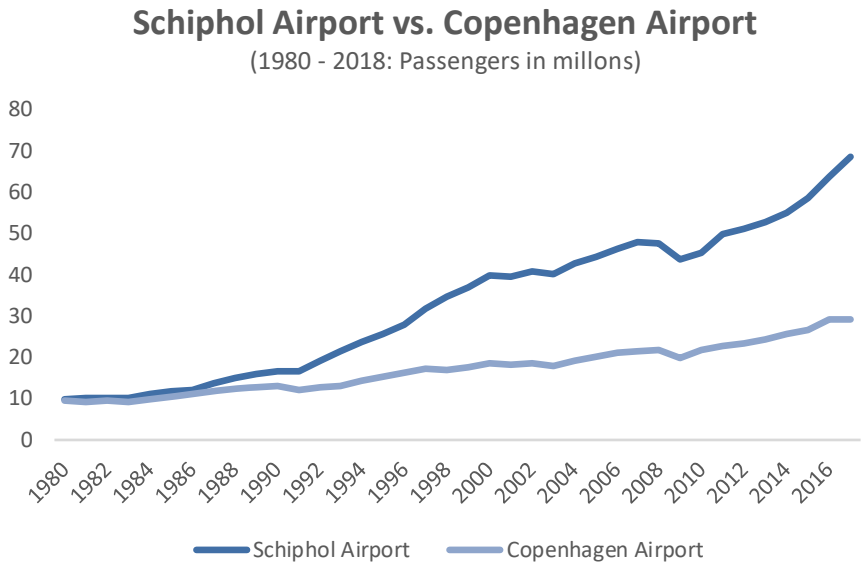

Figure 2: Comparison of total number of passengers in Amsterdam Schiphol Airport and Copenhagen Airport. In early 80s the two airports had approximately the same size, while Amsterdam Schiphol Airport in 2016 2.2x larger in terms of number of passengers. (CPH data, Royal Schiphol Group, 2018).

The importance of hub airports.

Aviation is based on controversies, on one hand the aviation helps to facilitate domestic, regional and global coherence and supports the distribution channels of good and services including tourism along less tangles elements such as culture and knowledge. In Denmark the economic effects of the aviation sector is estimated to be up to DKK 100bn (Copenhagen Economics, 2015, p. 7). On the other hand, aviation is also linked to externalities as listed above. During the last years there has been an increasingly debate about the emission from aircrafts and the potential effect on the global warming. This has e.g. in Sweden led to environmental imposed regulations from April 2018 on aircrafts in form of additional taxation on airline tickets departing from Sweden, with the purpose to reduce the environmental impact from aircrafts, consequently the future prognosis for traffic development in Swedish airports have been reduced[4]. This illustrates one of the controversies associated with aviation: The benefits of the growth versus externalities.

[4] See: https://www.transportstyrelsen.se/sv/Press/Pressmeddelanden/flygskatten-sanker-prognosen-for-flygresor/

Limited research on aviation in Denmark.
Across Europe, there are some traditions of conducting aviation research, but for some unknown reason, the research attention towards aviation in Denmark is very limited. Based on a review of research papers presented at the largest Danish Transport Conference *Traffic Days*, there have from 2005 to 2017 only been presented 11 research projects focusing on different dimensions of aviation in contrast the total nearly 1.000 presentation of different aspects of transport research on e.g. road or rail. (see section: 2.4 Field of Aviation and Airport Research). The last couples of years, though, there have been an increasingly political attention towards aviation in Denmark in relation to development of the first Danish governmental aviation strategy published in 2017. This strategy was to some extent based on different consultancy reports arguing for different challenges within the Danish aviation sector. Disregard of this, I will still argue that research within aviation in Denmark is very limited.

Airports - between market and politic
Due to liberalization of the aviation market in the 1990s and the increased corporatization of major airports, the airports have changed its role within the society. Consequently, airports are no longer passive infrastructure providers, but airports are now an active part in developing connectivities by engaging with airliners and other stakeholders (see also Chapter 3 Aeromobilities). Copenhagen Airport is such an example, but this process takes place all over Europe. Historically, major airports have been financially regulated to varying degrees due to the nature of its natural geographically monopoly. As I will argue for in Chapter 3 Aeromobilities, an airport cannot be understood as an isolated entity, but should be understood as an integrated part of society. However, it seems that the historically political attention towards aviation in Denmark have been vague due to other transport focal areas. Even though there have been established various committees addressing aviation challenges, the low political attention has not fostered an increased cooperation between the stakeholders including authorities where development of aviation is understood from a wider societal strategical point of view – and not only as a regulated industry. This has been one of the drivers for me to explore and understand airport developments between market and governmental politics, through governance "thinking". Such approach that bridges airports and the state in generating a platform where different viewpoints can interact and be coordinated in order to develop a common understanding of direction for further development of aviation could seem more beneficial to development of connectivities in the Danish society. This forms the foundation for the empirical and theoretical work in the thesis.

The structure of the thesis
Instead of conducting a research based on quantitative measures, I will, as stated, in this thesis, have a qualitative approach to understand the development of the production of aeromobilities. After this brief presentation of my research questions

and the context that frames my wondering, I will shortly present an overview of each of the chapters in the thesis:

Chapter 2: What is a Hub Airport? Firstly, I will elaborate on different perspectives on hub airports, and how these have developed in line with structural changed in the aviation industry. Further, I will make an overview of conventional aviation research in order to frame the exiting research on aviation.

Chapter 3: Aeromobilities. Then I will layout out the foundation for an aeromobilities approach based on the new mobilities paradigm by Urry and Sheller to understand the production of hub airports. I will argue that hub airports cannot be considered as pure flow machines, but needs to be understood as a relational and dynamic process with and within society based on nexus of regional, national and global controversies. Additional, I will also argue that hub airports no longer just provide capacity, but rather play an active role in the production of aeromobilities by actively engaging the development of new connectivities.

Chapter 4: Theory of Science. Hereafter, I will argue that aeromobilities need to be viewed as context-dependent and as such, it will not be possible to generate a universal truth of understanding of the aviation system and the driving forces of the system. Aeromobilities research focuses more on an approach where systems are dynamic over time and therefore the understanding of the system changes over time. Further, aeromobilities research argues for associated meanings or discourses as well as dynamic causalities as a way to understand airports. In line with this, aeromobilities research founded in critical realism needs to be conducted using a range of methodologies and approaches as opposed to conventional aviation research that tends to rely on predominantly quantitative methods.

Chapter 5: Methodology. After the layout of the meta-theoretical position, I will present my methodology. The overall frame of my research design is to conduct four case studies of European hub airports and set recommendations in relation to Copenhagen Airport. The empirical data will consist of both quantitative and qualitative data. The system consists of various objects that are interrelated due to different dynamic causalities and the design-foundation of the system is based on different rationalities. The understanding of rationalities or meanings will be generated by using discourse analysis in relation to interpretation of interviews and various written materials, which also constitutes the empirical data for understanding the dynamic causalities. This transdisciplinary approach is appropriate to gain insight to the thoughts behind aeromobilities' approach and to grasp the complexity of aeromobilities' production.

Chapter 6: Understanding Airports Through Governance: Policy and Materialities. Lastly, before my case studies, I will elaborate on my theoretical perspective. Even though aeromobilities have a wider societal perspective, the investigation of how

airports are governed as an active part of society is less developed. I will lay out the foundation for a governance model where airports and the state can create a platform where different viewpoints can interact and be coordinated in order to develop a common understanding of direction for further development of aviation. The governance of the selected European hub airports will be analyzed in line with the thoughts from critical realism, where outcome of a system depends upon dynamic causalities between the different objects within the system. I have in this thesis chosen to look at the hub airport through the notion of airport governance, and with this perspective argue that the production of hub airports takes place in a nexus of Policies and Materialities. Hereafter I will conduct my four case studies before the cross case analysis and the analysis of Copenhagen Airport, conclusion and perspectives.

Chapter 7: Case – Amsterdam. This case hub airport have been chosen due its remarkable development in connectivity in relation to Copenhagen Airport. I will in this chapter argue for a discourse: *"Balanced hub aviation as engine for society"*. This discourse is founded on articulations and practices that not necessarily are pointing in the same directions. On one side, I will argue that aviation in the Netherlands is understood as being more than just aviation. Aviation is not considered to be a stand-alone business, but rather as a national strategic instrument articulated in a *Mainport Strategy*, where the whole is greater than the sum of its parts. In addition, there is a focus on hub airlines in Schiphol Airport and this has won hegemony in relation to leisure traffic[5]. Further, an outward perspective and long-term liberal mindset has formed a practice of being first-mover in relation to negotiation of bilateral agreements, which have generated significant connectivity.

Chapter 8: Case – Helsinki. This case is selected due to its significant development of long-haul flights to Asia the last decades. My analysis shows that making the hub airport in Helsinki is based on dynamic causalities in a nexus of Policies and Materialities and founded on a discourse: "*Finland is an Island*". This discourse is supported by a striking articulation such as: "*We think it is a question of life and death: the Helsinki Airport"*. The discourse is also represented in practices and articulations ranging from local political pressure on labor unions and global practices manifested through long-term commitment in building relations to Chinese airports and traffic right negotiations. The discourse lays out the foundation for a nexus of dynamic causalities between policies and different materialities that among others includes national aviation strategies, foreign policies, geographical location of Finland, development of domestic areas and expansion of Finnair's long-haul fleet. This elaboration of findings illustrates the production of aeromobilities is not a mechanical process, but is an outcome of different interests among stakeholders with perspectives founded in a local, regional and global understanding.

[5] The focus on airlines facilitating hub function at Schiphol Airport can be seen in the selection criteria, which will come in to action 2019 (Royal Schiphol Group, 2017a, p. 8].

Chapter 9: Case – Brussels. This case was selected due to the bankruptcy of the former national carrier airline Sabena in order to understand how the society related to such a loss of connectivities. I conclude that the production of aeromobilities in Belgium and particularly in the Brussels airport is founded on place-specific drivers that have a local to global span. The federal system in Belgium is a key driver for developing aeromobilities, since it facilitates a decentralized focus on Brussels airport and dampens the development. Sabena airlines and its bankruptcy have highly affected the production of aeromobilities in Brussels airport. The situation must also to a great extent be seen in the light of local interests in the regions of Wallonia and Flanders. Further, the configuration of the runways in Brussels airport has large consequences for how the production of aeromobilities takes place due to flight paths over high-density housing areas. Despite these challenges, political attention towards aviation is low which can be linked to the regional setup that generates less political strength to focus development of the national airport at the expense of regional airports. Based on the analysis I have identified a discourse: *Decentralized production of aeromobilities*. This discourse is supported by articulation by various stakeholders and practices that do not provide a unilateral focus on Brussels airport. Consequently, the aeromobilities production in Belgium doesn't live up to its potential.

Chapter 10: Case – Zurich. This case was selected due to the grounding of the national carrier Swissair in order to understand some of the consequences of this development. The production of aeromobilities and the making of a hub airport in Zurich Airport is unfolded in a nexus of local and regional Policies and Materialities. I will argue for a discourse: "*Hub aeromobilities on the basis of direct democracy and a market"* that encapsulates the production of these Policies and Materialities. Further, I will argue that this discourse is based on a rationality of the federal system in Switzerland. This discourse is the foundation for Policies and Materialities, which is linked to a nexus of conflict with a neighbor country, regional, local stakeholders, market forces and direct democracy. A critical dimension is the capacity constraints at Zurich Airport, and where the potential capacity expansion is challenged due to the federal system with direct democracy. The political attention towards aviation is currently rather low, since – as I will argue – there is currently no *burning platform*. In contrast, back in the early 2000s, where Swissair was in financial distress, the political attention was higher and where there was establishment of a commission that was monitoring the Swiss integration into the airline Lufthansa to secure Swiss national interests. This case illustrates further that local, regional and global events together with the potential conflict between market forces and direct democracy have a strong influence on the production of aeromobilities in the hub of Zurich Airport.

Chapter 11: Cross case analysis. After analyzing my four cases based on my analytical framework consisting of Policies and Materialities in order to identify dynamic causalities along discourses and underlying rationalities, I have in the cross case analysis identified four themes that are influencing the development of airport hubs. Additional I will elaborated on elements that is based on my empirical findings

and that could be included in development of an airport governance model. The themes are labeled as following: *Policies approach to spatial planning, Policies approach to externalities, Policies approach towards hub airports, Overall political attention to develop hub airports* and *Governance model for hub airports*.

Chapter 12: Case of Copenhagen. Based on my analytical framework I have analyzed the case of Copenhagen Airport, I have found that there historically has been a low political attention towards developing the hub function of Copenhagen Airport. I have argued that the historical low political attention towards the hub function in Copenhagen Airport can be found in the fact that the hub function in Copenhagen Airport has existed since the 1950's and it has been take taken for granted by the political environment. This low political attention can also be linked to the complexity of the Danish aviation sector. However, the function of the hub airport has decreased since the 1990's because of the liberalization of the aviation industry and particular associated with the increased competition between point-to-point traffic within Europe. The last couples of years the political attention towards aviation in Denmark has increased due to the recognition of the societal importance of a Danish aviation sector. This is the background for the new *Aviation Strategy for Denmark* in 2017, which has enforced a new regulatory model for Copenhagen Airport focusing on economic incentives for promoting transfer traffic at the airport besides several other initiatives that are supporting the infrastructure and collaboration among stakeholders. In relation to other European airports the noise externalities around Copenhagen Airport is limited due to the political framework developed in the 1980's and therefor the foundation for increased aeromobilities are present. Whether or not these dynamic causalities will result in an increased hub function is still to be seen in a highly competitive market. In relation to governance models in the Danish aviation industry, there are several stakeholders committees, however a governance model as I suggest has been absent. Lastly in this chapter I have elaborated on the findings in the Copenhagen case in relation to the cross case analysis of the four case airports.

Chapter 13: Conclusion: In this chapter, I have presented the overall conclusion to the PhD based on a curiosity of the driving forces, mechanism, discourses and rationalities behind the making of hub airports. Further, I have also presented a governance model of hub airports developed throughout this thesis. It has resulted in 11 main findings, where three are theoretical, four are empirical findings and four are key findings in relation to Copenhagen Airport.

Chapter 14: Perspectives: This chapter elaborate on different lines of thought developed throughout the years of research. Are there any other ways to understand and develop Copenhagen Airport as a hub if the trends of transfer traffic continues to decline despite the initiatives formulated in the *Aviation Strategy for Denmark 2017?* Would it be possible to develop Copenhagen Airport further by developing the ground transport network and attracting business headquarters and similar businesses to generate a gravity center of economic activities in line with Schiphol Airport or should

the hub airport facilitate a platform for e.g. Asian Airlines that need a transfer hub for traffic towards America? - This could also be supported by a feeder network of low cost airlines. To support the Danish global connectivities an increased cooperation with other airports could be pursued. Additional, in order to develop the relationship to the Danish society, the airport could engage further in solving different challenges the industry is facing. Lastly, the Copenhagen Airport could articulate a new strategy that embraces the economic and cultural importance of the airport in the Danish society.

Chapter 15: Further research: The approach to understand aviation based on aeromobilities are less developed in comparison to conventional aviation research. Therefore, this calls for additional research for understanding aviation in a wider context. I have suggested three themes of research on the basis of this thesis that could be interesting to develop: *Investigate airport alliances, Denmark in the global* and *Airports in the local.*

In the next chapter, I will begin an elaboration on how a hub airport is understood based on the conventional aviation research tradition and the wider founded aeromobilities approach.

2 WHAT IS A HUB AIRPORT?

> *"Airports are one of the key ways in which cities and societies seek to enter or develop their positioning within the global order." (Urry, 2007, p. 142)*

2.1 PROLOGUE

Humanity has dreamt of mastering the ability to fly for centuries. Hydrogen filled balloons allowed humans to elevate from the ground and experience 'flight' and by 1903, the Wright brothers managed to take in flight heavier-than-air aircrafts. Initially, it was predominantly military, scientists and sportsmen, who made use of this innovative technology. Militaries used aircrafts for reconnaissance missions and to train pilots in speed and maneuvers in the event of combat, while geographers used aircrafts to collect information for maps. (Blatner, 2005; Gidwitz, 1980; Roseau, 2012). In 1918, the first international air route was established in the Austro-Hungarian Empire: a mail service between Vienna and Kiev (Gidwitz, 1980, p. 37). The commercial passenger transport slowly developed, with aviation route expansions by the former colonial powers of Britain, The Netherlands, Belgium, France, and Italy to their respective colonies (Gidwitz, 1980, p. 40). At the beginning of modern aviation, airports were only small airstrips, but as civil aviation activities grew, airports evolved from being remote and difficult to access to becoming large, complex infrastructures with terminals, runways, and landside facilities (Dierkx & Bouwens, 1997, p. 13).

In this chapter, I will elaborate on different perspectives on hub airports, and how these have developed in line with structural changed in the aviation industry. An airport can be viewed and understood differently depending on perspective. One way to perceive an airport is as pure infrastructure that is not dependent on the context. As one airline CEO states:

> "*Airports are simple, just infrastructure*[6]"
> *(Jesper Rungholm CEO Danish Airtransport A/S, Consultation ini Transport- og Bygningsudvalget, 08-12-2016*: *1:39:30).*

[6] Own translation: "Lufthavnen er altså bare infrastruktur"- see: https://www.ft.dk/aktuelt/webtv/video/20161/tru/tv.3606.aspx?from=07-12-2016&to=09-12-2016&selectedMeetingType=Udvalg&committee=&as=1#player

However, such a perspective can be contested. In the book *The Airport Business* from 1992, Doganis describes an airport as:

> "*Airports are complex industrial enterprises. They act as a forum in which disparate elements and activities are brought together to facilitate, for both passengers and freight, the interchange between air and surface transport. For historical, legal and commercial reasons the actual activities within the airport for which an airport owner or manager is responsible vary between countries and between airports in the same countries." (Doganis, 1992, p. 7)*

As Doganis states, the activity level for an airport is influenced by contextual elements, such as historical, legal and commercial developments. This means an airport needs to be understood in a nexus of controversies. Direkx and Bouwens explain that, due to increased activities at airports, there is an increase in land use due to facility expansion and an increased level of noise – especially by the start of the jet age. As a result, the airport has become a place of controversies. The conflict is between aviation and environmental interests in relation to e.g. land use and noise-externalities and additional, the conflict can also relate to how to settle these conflicts (Dierkx & Bouwens, 1997, p. 13).

In line with this, I will, in this chapter, argue that airports should be understood differently – not as a standalone business but as a production of local, regional, national and global Policies and Materialities. As I will show later, the airports have been confronted with changing framework conditions, which enable new roles and challenges, and consequently new ways to address airports in order to understand the production of aviation.

Aviation System

The aviation system is a multifaceted system. There is a multitude of different actors in the larger scope of the transport system, of which airports are a part.

Viewed in isolation, the aviation system consists primarily of airlines and airports that provide capacity for passengers to travel from one point to another. By expanding the scope we see that, in addition to these primary functions, there is a wide range of actors that provide capacity along the passenger's journey: e.g., ground transport in various forms provide capacity for the passengers to reach their final destination. In order to support this distribution of passengers, there are different support functions that enable the production of aviation to be safe and secure. These support functions include air traffic control, meteorological services, police, fire and security services (Doganis, 1992, p. 7). In addition to these services, airports and airlines make use of

various suppliers, including catering, cleaning, ground handling companies and maintenance providers (Doganis, 1992, p. 9).

In addition to the actors who are directly involved in the transport system, there are numerous other stakeholders influencing the production of aeromobilities. The political stakeholders, within both the local and global political environments, are setting the frameworks based local, regional and global agendas. An example of global agenda could be control mechanisms, such as the EU institutions or ICAO. Further, there are different interest groups, such as labor or industry confederations, tourism organizations, environmental organizations, owners of infrastructure and land as well as local neighbors that all have different agendas and seek to influence how the production of aeromobilities takes place. This framing is not exhaustive, but it illustrates some of the stakeholders that either directly or indirectly are influencing the facilitation of the aviation transport chain. This demonstrates that the system itself is quite complex in terms of interdependency between all actors.

Some of the framework conditions (see next chapter) in the aviation sector have fostered new airline business models resulting in changes to the structure of the aviation market. Further, some airports have been privatized to various degrees. These developments have changed the role of airports, which can no longer be perceived as a passive infrastructure that solely provides capacity. The airport is now an active entity in developing connectivity, by actively trying to attract new airlines. This is a possible because there is a tendency for airlines to become more *footloose* by reallocating capacity or switching routes to match the market demand (Thelle & Sonne, 2018, p. 232). All airlines, to some degree, are trying to increase and optimize operations. Low-cost airlines have a higher degree of route-switching, while hub carriers even though they have a structural dependency on hub airport(s) still optimize their network by redistributing their route network (Thelle & Sonne, 2018, p. 234). Airports have become a more active entity in the production of aeromobilities. This motivates a need to increase the understanding of the production of airports and hub airports, which is essential element in the production of aviation.

2.2 DEVELOPMENT WITHIN THE EUROPEAN AVIATION MARKET

The modern organization of the aviation transport system has evolved as a result of the different regulatory frameworks developed and adopted since the early 20th century.

Historically, the Paris Convention in 1919 and the Chicago Convention in 1944 did set some standards for the organization of air traffic and determination of airspace rights. The Paris Convention settled an agreement that sovereign states have the rights

to airspace above their territory. At the Chicago Convention in 1944, 52 countries considered a multinational agreement focusing on three aspects:

- The exchange of air traffic rights;
- The control of fares and freight tariffs; and
- The control of flight frequencies and capacity.

At the Chicago Convention there was no final arrangement in order to generate a multinational agreement to settle traffic rights due to conflicting viewpoints between parties. The US, The Netherlands and Sweden were mostly in favor of liberal and unrestricted – so call Open Sky – agreements; but on the other side, the UK and other European countries were against the liberal approach since their airlines were less competitive as a result of WWII. Instead of reaching a multinational agreement at the Chicago Convention, air traffic became regulated based on bilateral agreements focusing on capacity and frequencies, and tariffs negotiated though IATA[7]. Even though the Chicago Convention did not reach agreements on commercial traffic rights, the participants at the conference did agree upon a framework for safe aircraft operations, along with the establishment of an international organization, ICAO, for setting up international standards and operational standards for aircraft operations (Doganis, 2010, p. 28-29).

These bilateral agreements on traffic rights had both economic and noneconomic impacts and restricted the airlines to various levels of freedom[8]. The regulations consisted of three pillars: inter-airline pooling, bilateral air service agreements, and traffic and pricing agreements that were negotiated trough IATA (Doganis, 2010, p. 25). This caused a highly regulated environment within the air transport system that motivated far less innovation and changes. This regulated regime lasted until the late 1970s.

Liberalization of the airline market

In the late 1970s, the regulated aviation industry began to gradually change as a result of a liberalization process that started in the US and later in Europe. (Doganis, 2010, p. 25). This process is exemplified to some degree by the British prime minister Margaret Thatcher, who promoted a politic of liberalization and international co-operation (Jessop, 2000, p.156). The liberalization process within aviation was not applied to all routes, however. Within the European Union market and between the USA and the European Union, an Open Sky approach was applied. Open Sky agreements were also settled between some Asian countries and some European

[7] IATA: International Air Transport Association. An international airline organization founded in 1945 initially 57 members, today 280 airlines are member of the organization. See: https://www.iata.org/about/pages/history.aspx. Located: 15 September 2018.

[8] Within these levels of freedom, there are different definitions of how airlines are permitted to operate within a foreign country's airspace and airports. These rights refers to nine Freedoms of the air, where each of them describe a right for an airline. E.g. 1st freedom, gives foreign airline the right to fly over a foreign country without landing. (see more: (Doganis, 1991)

states. Today there are multiple Open Sky agreements, but a significant part of airline traffic is still regulated to some degree (Doganis, 2010, p. 25).

The liberalization process during this period focused on increased competition for the benefit of the consumer. The European Union liberalized the airline market in Europe between 1987 to 1993 using a three-step process or packages (Doganis, 2010; Iatrou & Oretti, 2007). The first package was in 1987, the second package was in 1990 and the third in 1993. As part of this process, restrictions on market entry, capacity, frequency and pricing were removed within the European Union for airlines from member states (Burghouwt, Mendes de Leon, & De Wit, 2015, p. 6, 11). As specified during this process, European airlines needed to be owned and controlled by members states or member state companies to be subject to this more liberalized approach (Doganis, 2010, p. 54).

This liberalization in Europe imposed new rules on European airlines to increase the availability of new services, such as new destinations and increased frequencies of trips. Additionally, new airlines entering the European market with new business models, including low-cost airlines, resulted in decreased ticket prices to the overall benefit of the passengers (Burghouwt et al., 2015, p. 11). In the late 1990s, national carriers rearranged their networks and some national carriers increased their hub-and-spoke operations at national hub airports due to the removal of restrictions on capacity, however this redistribution did also led to decreased connectivity in other airports (Burghouwt & Veldhuis, 2006, p. 107).

Traditional airlines, often labeled as “flagship carriers”, “network airlines”, “legacy carriers” or “national carriers” are typically characterized by a multi-market segment focus, online and interline connections with cooperating carriers, membership in a global alliance, adherence to traditional distribution strategies, restrictive fares and complex booking policies, amenities and reward programs, and both short- and long-haul operations with a diversified fleet. Airlines such as SAS, Lufthansa or British Airways are typical of this category (Hvass, 2008, p. 57). Historically, national airlines have had a dominate position in terms of passengers in the major airports. This would include SAS in the Copenhagen Airport[9], British Airways in Heathrow, KLM in Schiphol Airport, Swissair in Zurich Airport, and so forth.

Low-cost airlines in Europe, which were a result of the EU’s liberalization process, are often described as “no-frill airlines” or “point-to-point airlines”. These airlines are typically characterized by a single-market segment focus, no interline connections, a non-alliance membership, a general bypass of traditional distribution strategies, non-restrictive fares and simple booking policies, no amenities or reward programs, and

[9] Copenhagen Airport is the name of the physical airport in Denmark, however the company name is Copenhagen Airports A/S – airports arin e plural since the company also owns and operates the general aviation airport: Roskilde Airport, south-west of Copenhagen.

short-haul operations with a single fleet. Airlines such as Ryanair and easyJet fall within this category (Hvass, 2008, p. 57).

Distinguishing between whether an airline is labeled as a low-cost airline or not depends on the selection criteria applied. Depending on the selection criteria, the number of airlines labeled as "European low-cost airlines" can vary from around twenty to more than forty (Burghouwt & de Wit, 2015, p. 112). This vague approach to low-cost labeling criteria causes some confusion, as there are legacy carriers who regularly adopt elements from the low-cost airlines and vice-versa. Several legacy carriers are also adopting operational elements from the low-cost business models by, for example, establishing low-cost subsidiaries (Graf, 2005), while some low-cost airlines are introducing reward programs, etc. In addition to the categories of low-cost and network airlines there are other business models such as regional, charter or specialist airlines (Whyte & Lohmann, 2016, p. 109).

There has been a tendency for the low-cost airlines to operate within a regionally defined area, such as Europe or North America. Despite this, several low-cost airlines have tried to enter the long-haul segment, with the latest being the Norwegian Airline Group[10] which has for example have established long-haul routes between Europe and US. In relation to prior airlines operating long-haul, Norwegian does not operate in a classic hub-and-spoke system but rather operates long-haul traffic from multiple European airports[11] (Harvey & Turnbull, 2016, p. 316).

The developments that have come about due to the liberalization process have changed the structure of the aviation industry across Europe. The low-cost airlines have been successful in terms of developing their business models relative to their number of passengers, while the network airlines are, to some extent, challenged by an increase in competition, especially since the low-cost airlines are able to offer competitive airfares (Burghouwt & de Wit, 2015, p. 109). Historically, traditional airlines have focused their business on a specific geographic location (e.g., SAS has been operating to and from Scandinavia, Finnair has connected Finland to the world, and Brussels Airline has had a focus on connectivity to and from Belgium). This is not a universal truth; there have been and still are other setups, but this specific geographical focus has been a predominant tendency.

Due to liberalization, it is recognized that airlines have become more *footloose* – meaning airlines are no longer focusing in the same way as they have previously on

[10] Norwegian group of the parent company for the carriers: Norwegian Air Shuttle ASA, Norwegian Air International Ltd. Norwegian Norway AS, Norwegian Air UK and Norwegian Air Argentina (https://centreforaviation.com/data/profiles/airline-groups/norwegian-group).
[11] See: https://centreforaviation.com/data/profiles/airlines/norwegian-air-shuttle-asa-dy [Need password]

one given market and airport. This tendency is especially the case with point-to-point airlines that are more active in configuring their network for profit optimization. Network airlines are also rearranging their networks by changing frequencies and destinations, but they are still to some extent bound by their hub-and-spoke model (Thelle & Sonne, 2018, p. 2-3). This evolution indicates that the airport, to a considerable extent, must position itself in the market to gain traffic. In this sense, the airport cannot be perceived as a passive infrastructure but as an active actor in creation of aeromobilities.

The change in market composition after the entry of low-cost airlines is illustrated in the figure below. Data constraints have resulted in the data representing only the years 2004 to 2017. The figure illustrates that low-cost airlines have been able to gain a significant market share, from little more than 10% in 2004, to approximately 24% in 2014.

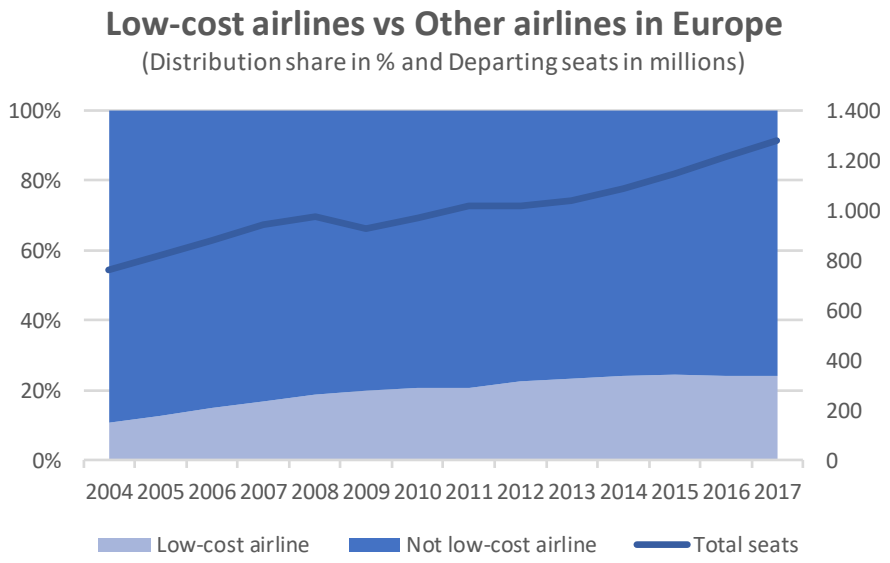

Figure 3: Illustration of the increased market share for low-cost airlines within the European market in the years 2004-2017. Only 21 airlines were labeled as low-cost airlines according to (Burghouwt & de Wit, 2015, p. 112) (SRS seat data).

Hub airports

The business model for a network airline is an important feature since they often have set up a hub-and-spoke model as opposed to a point-to-point business model. Airlines using the hub-and-spoke model have a central airport(s) in their network acting as the hub airport, where passengers make their transfer. This hub airport has a ratio of transfer passengers, and by this business model the airport is able to serve more destinations than the local catchment area could otherwise support; and therefore an airport with hub activities is able to facilitate more connectivities than an airport without any hub connectivities (Button, Lall, Stough, & Trice, 1999, p. 55). Further, airlines operating within a hub-and-spoke system are able to provide a network with higher frequencies allowing travel back and forth the same day. This is especially beneficial to the business environment (Burghouwt, 2014, p. 30).

It does not have to be a single airport that constitutes an airline's hub airport. The airline's hub system can also consist of multiple hub airports where the airline concentrates its operations (Burghouwt, 2014, p. 30). From an airline operational point of view, multiple hubs are generally less attractive than single hub operations, since additional hubs reduce the economic benefits of density and increase operational complexity (Burghouwt, 2014, p. 31). However, there are several reasons to deviate from single airport operations, as Burghouwt lists: spatial coverage, level of demand, frequency gain, capacity shortage at the primary hub, strategic positioning and entry deterrence, better aircraft utilization, bilateral restrictions and aviation laws, and pressure from unions (Burghouwt, 2014, p. 31-32).

Another understanding of a hub airport – apart from an airport that facilitates an network airline's business model - is where the hub airport is understood as a nexus ground transport and airline systems. In this context, a hub airport is part of a nexus of connectivity between trains, busses, cars, sea links and airlines (L. Budd & Ison, 2016, p. 26-27). According to Cambridge Dictionary the word '*hub*' means "*the central or main part of something where there is most activity.*"[12] This indicates that a hub airport in this meaning has a slightly wider focus different from a hub airport based on an airline's business model, as articulated above, where a hub airport is central for a given airline's business model and facilitates transfer passengers. The hub airport definition articulated in this paragraph does not only relate to any airline business model, but purely indicates an airport that is central to a network of ground and airbourn transport systems.

Therefore, the articulation of a hub airport can be interpreted differently; whether the airport is a hub for an airline business model with transfer passengers or the airport is configured as a hub in an infrastructural network with rail, roads, sea and airlines.

Articulations of a hub airport neither rely on each other nor exclude each other. Each articulation indicates that you can have an airport central to a ground transport

[12] See: https://dictionary.cambridge.org/dictionary/english/hub

network facilitating point-to-point aviation traffic, or you can have an airport central in an aviation hub-and-spoke system that does not necessarily have to rely on the centrality of a ground transport network. In the conventional aviation research, the hub airports mostly are related to the airports that provide capacity for network airlines

The development of hub airports – based on an airline's business model – can vary, as illustrated in Figure 4, the liberalization of the European airline market has had consequences on the number of hub airports. After the liberalization, there was a significant increase in hubs, but the increased competition resulting from liberalization or rationalization caused a number of cases where the hub function was subsequently decreased again (Burghouwt & Veldhuis, 2006, p. 107).

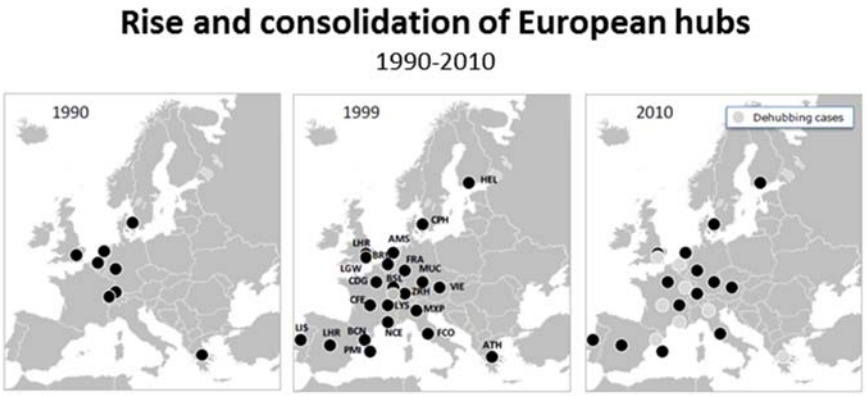

Figure 4: The rise and consolidation of European hubs in the years 1990-2010. Hub airports are here defined as airports with hub carriers with more than 30% transfer share (Burghouwt et al., 2015, p. 28).

As illustrated above, the aviation market in Europe has changed significantly in the last decades due to liberalization. The focus of this thesis, as stated in Chapter 1, is to understand the governance of hub airports and what drives developments of these. Burghouwt and Dobruszkes argues that successful hub airports have the below-listed characteristics (Burghouwt & Dobruszkes, 2014, p. 610):

- A central geographical location vis-à-vis the most important traffic flows;
- Large catchment area;
- Sufficient peak-hour capacity;
- Short minimum connecting times;
- Availability of international traffic rights;
- A strong hub carrier, which is part of a global airline alliance; and
- Sufficient markets that can be monopolized by the hub carrier to achieve high yields.

As I will return to later in Chapter 3 and 4, other elements may also influence the development of hub airports. However, as illustrated in Figure 4, the number of hub airports has fluctuated significantly during this period and therefore challenged the industry's foundation for connectivities.

Airport development in ownership structure

In addition to the liberalization of the aviation industry in Europe and some of the results listed above, some airports have changed ownership structure. Starting in the late 1980s, there was a new shift in the airport industry where some airports became privatized (Graham, 2011, p. 3). The privatization process could take many forms, but: "*…it is usually associated with the transfer of the management of an airport and in many cases the ownership as well, to the private sector*" (Graham, 2003, p. 12).

There is a long industry tradition for discussing private ownership versus public ownership. On one hand, privatization can be beneficial since it reduces the need for public sector investments, it may improve efficiency, and airports tend to become more competitive as a result of privatization. On the other hand, privatization of airports may lead to higher prices due to a monopoly of power, lower investment levels and less concern related to an airport's environmental and social impact (Graham, 2003, p. 12). Today, nearly half of the passengers in Europe depart from an airport with private shareholders (Thelle & Sonne, 2018, p. 7).

This privatization of airports can be seen in association with the development within some European states, where there was a political shift towards the "*competition state*" and the associated "*decentralization of governmental regimes"* (Jessop, 2000, p. 29). I will elaborate more on this political development in section: 6.2.1 Developing of Governance Structures.

In line with these privatizations, there was an increased focus on the development of regulatory frameworks to help prevent monopolistic behavior from airports[13] such as higher airport charges, reduction in service levels and limited investments in capacity (Graham, 2011, p. 7). The current financial regulation of airports within the EU is articulated in the national legislations, which are bound by the EU Directive 2009/12/EC[14], which is in line with the ICAO charge manual (ICAO, 2012). The EU charge directive applies to all EU airports with more than 5 million passengers and the airport with the highest number of passengers in the given country. The directive articulates the general framework for setting airport charges, including process and

[13] The Directive 2009/12/EC, (2) states: "It is necessary to establish a common framework regulating the essential features of airport charges and the way they are set, as in the absence of such a framework, basic requirements in the relationship between airport managing bodies and airport users may not be met."

[14] Directive 2009/12/EC of the European Parliament and of the Council of 11 March 2009 on airport charges – located 24.05 2018 on: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0012&from=EN

principles. In relation to charges, it articulates that the user charges must not be discriminatory between users of the airport. The charges must be cost-related with a possible adjustment for a level of cross-subsidy from commercial activities at the airport. The individual charge category may be differentiated according to service level as long as this relates to a transparent justification. In addition, airport charges may be differentiated due to public and general interest, but this modulation must still be relevant, objective and transparent.

2.3 CONVENTIONAL AVIATION RESEARCH

> *"Aviation is an outstanding example of a commitment to the widely discredited 'predict and provide' philosophy that dominated road building discussions until the early 1990s. Individual airlines and airport operators are deeply committed to the year-on-expansion of aviation without limit, and are prepared to invest large amounts of money to achieve this objective. Such a commitment to growth is fundamentally at odds with policy commitments to sustainable development." (Whitelegg, 1997, p. 88)*

This section will introduce current conventional aviation research as based on a '*Predict and provide*' theories focused on business and econometric models. I will argue that the conventional aviation research tends to address hub airports as neutral traffic points, isolated from their context and society. In contrast, I will argue that airports needs to be understood as imbedded in society. In the chapter, I will explore the historical, theoretical and scientific foundations for conventional aviation research. I will also address some of the pitfall from the conventional aviation research. In addition, I will assess the current aviation research in understanding airports and aviation in light of the challenges hub airports are facing today and may face in the future.

Conventional analyses of aviation often rely on '*predict and provide'* approaches, with a significant focus on quantitative data (Whitelegg, 1997, p. 14) see also (Jensen & Lassen, 2011). In the 1960s and 1970s, transport geography was: "*predominantly quantitative, positivist and law seeking"* (Cresswell & Merriman, 2011, p. 2) in (Jensen, 2015, p. 480), and the whole research paradigm relied on a "*rational mobile person"* (Jensen, 2015, p. 480) that is universal and context-independent. These analytical approaches tended to be for statistical optimization or forecasting of passengers or cargo units moving from Point A to Point B in order to maximize traffic flow, trade, or gains, while minimizing travel costs and travel time as their focus (Goetz, 2015, p. 366) (see also: (Bloch & Lassen, 2016)). Aviation is often illustrated or described as an interlinked transport system that facilitates passenger transport: airlines are providing capacity in airspace, while airports are providing capacity for airlines and passengers on the ground (Graham, 2003, p. 1). This indicates that the

conventional aviation research tends to rely on a universal knowledge where airports are perceived as neutral places and are researched through a one-dimensional approach with limited set of methods.

There are different fields of aviation research and depending on one's perspective there are different focal points. Conventional aviation research seeks an understanding of an airline's business model and airports, including financial optimization, regulation and capacity usage; and in relation to this, flow optimization of aircraft, baggage and passengers. Beside these focus points, conventional aviation research often seeks to understand the dynamics within the airport and airline industry in relation to current market development, competition, new technologies, safety, security and external shock. In addition, There is research regarding the economic effects and different externalities of airlines and airports on both a local and global level

Rigas Doganis, one of the world's most prominent researchers using the conventional focus on airline and airport business models, recognizes that the activity level at an airport is influenced by historical, legal and commercial reasons (Doganis, 1991; Doganis, 1992). As stated in the beginning of this chapter, Doganis recognizes that the activity level at an airport is influenced by historical, legal and commercial reasons (Doganis, 1992, p. 7). However, conventional aviation research tends to rely on an instrumental rationality that seeking logical correlations and grounded in a positivistic-oriented science.

In addition to Doganis, several other international conventional researchers and academics have focused on aviation as an industry. Within Europe, different educational institutions have focused on different research fields within conventional aviation research – such as Cranfield University (UK), University of Westminster (UK), Bremen University of Applied Science (DE), University of Las Palmas de Gran Canaria (ES), University of Bergamo (IT), University of Antwerpen and Amsterdam University of Applied Science (NL) among others.

Along with ongoing research at universities, research societies and stakeholder organizations, including the German Aviation Research Society (GARS) and Airneth, initiate workshops in order to publish aviation books and conduct high-quality research projects[15]. In 2015, an EU-founded research program was initiated with special focus on the investigation of the relationship between air transport and regional development[16]. Together with a focus on promotion of cooperation between European researchers, the program also aims to develop a white paper to understand best practices of different research methodologies in relation to air transport and

[15] See: http://garsonline.de/working-groups/ or http://www.airneth.nl/
[16] See: http://www.cost.eu/COST_Actions/tud/TU1408

regional development[17]. The methodological approach within the program is will predominantly based on quantitative methods such as : "…*cost-benefit analyses (CBA), dynamic computable general equilibrium models (CGE), partial equilibrium models, total factor productivity (TFP), variable factor productivity (VFP), data envelopment analysis (DEA) and stochastic frontier analysis (SFA)"* (Air Transport and Regional Development (ATARD), 2014, p. 10).

2.4 FIELD OF AVIATION AND AIRPORT RESEARCH

In this coming section I will review international research on aviation in order to identify the focal points and approaches. First I will generate an overview of the predominantly focus with in the conventional aviation research. Second, I will present an overview of conventional aviation research approach to hub airport, thirdly, a short evaluation of Danish research on aviation and lastly research on economic effects linked to aviation

There are only a few active international academic journals focusing on aviation: the *Journal of Air Transport Management, Journal of Airport Management* and *Journal of Airline and Airport Management*. The *Journal of Air Transport Management*, established in 1994, is by far the largest journal, with more than 68 volumes and the only journal of these present on the Danish BFI list with academic publications (Danish Ministry of Higher Education and Science, 2017). The *Journal of Airport Management*, established in 2006, has only published twelve volumes, while the *Journal of Airline and Airport Management* is the newest with only seven volumes[18].

In my overview of aviation and airport research, I will only focus on the *Journal of Air Transport Management*, since it is the only academic journal accepted by the Ministry of Higher Education and Science and it is by far the largest journal focusing on aviation. The *Journal of Air Transport Management* focuses on policy, regulation and law, strategy, operations, marketing, economics, finance and sustainability (Journal of Air Transport Management, 2017). The journal has compiled and published more than 1.200 *Original research articles* since its inception in 1994. In addition to *Original research articles*, the journal also publishes research notes and book reviews, as well as articles presented at different aviation conferences. My

[17] See: http://www.cost.eu/. The webpages states: "COST is an EU-funded program that enables researchers to set up their interdisciplinary research networks in Europe and beyond. We provide funds for organizing conferences, meetings, training schools, short scientific exchanges or other networking activities in a wide range of scientific topics." (Cost, 2017).

[18] Number of volumes calculated as of 28 April 2018. The calculation is based on information from the Journal's homepage. Regarding *Journal of Air Transport Management*, all volumes and issues of have been assessed in order to evaluate the number of what is labeled as: "*Original research articles*". The total number of research articles in *Journal of Air Transport Management* from 1997 (Vol 1) to April 2018 (Vol 68) is calculated to be: 1.231.

estimation of research articles is based on the journals own classification of material as *Original research articles*. Below are is an illustration of the development of *Original research articles* in *Journal of Aviation Management.*

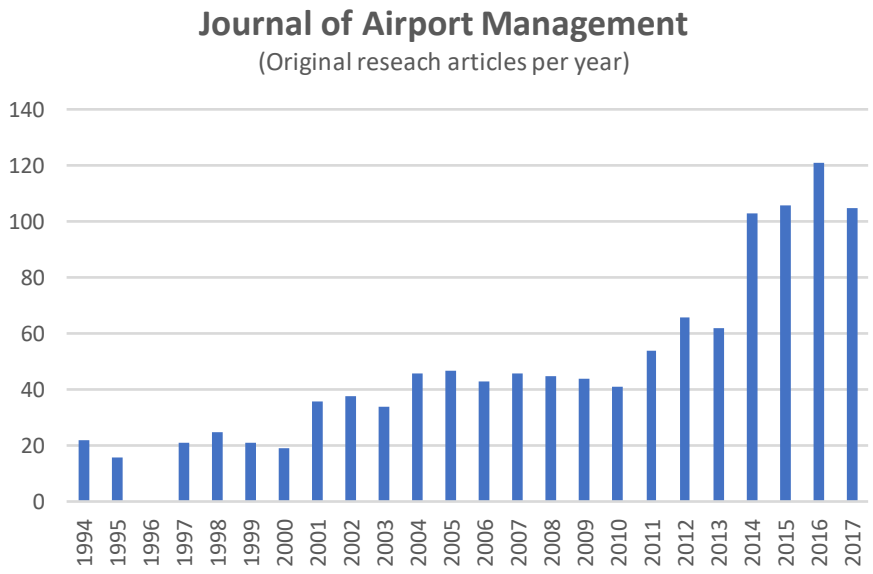

Figure 5: Illustration of reviewed Original research articles published in Journal of Air Transport Management (own calculation based on assessment of all issues of Journal of Air Management found on: https://www.sciencedirect.com/journal/journal-of-air-transport-management)

As stated above, the *Journal of Air Transport Management* focuses on a different subjects related to air transport management. In order to generate an overview of the different topics and focal areas, I will present the top 25 most cited articles[19]. Instead of focusing on the most cited articles, most downloaded articles could also be part of the criteria, but the most cited articles as criteria for this overview is the most appropriate, since it illustrates how these articles are used by researches in other reviewed material.

Predominantly focus areas within the conventional aviation research

The most cited articles in *Journal of Air Transport Management* can generally be categorized into three focus areas: airline, airport and consumers. Below, I will shortly

[19] The top 25 list of the most cited articles since 2013 from *Journal of Air Transport Management* is based on information on journal homepage: https://www.journals.elsevier.com/journal-of-air-transport-management/most-cited-articles Located: 29 April 2018.

state the focus of top 25 most cited articles based on the three focus areas: Airlines, Airports and Passengers.

The articles concerning airlines: These have a predominantly operational scope with a span from operational performance (Barros & Couto, 2013; Barros & Wanke, 2015; Lee & Worthington, 2014; Mallikarjun, 2015; Tavassoli, Faramarzi, & Farzipoor Saen, 2014) over energy consumption (Alonso, Benito, Lonza, & Kousoulidou, 2014; Cui & Li, 2015; Gegg, Budd, & Ison, 2014) to financial performance (Hsu & Liou, 2013). Likewise, some articles are evaluating airline business models both in terms of different airline characteristics (Lohmann & Koo, 2013) but also in terms of market entry for LCC's (L. C. S. Budd, Francis, Humphreys, & Ison, 2014; Dobruszkes & Mondou, 2013; Fageda, Suau-Sanchez, & Mason, 2015) and LCC's as subsidiaries to network airlines (Pearson & Merkert, 2014). Lastly, one article does evaluate airline performance within corporate social responsibility (CSR) (Q. Wang, Wu, & Sun, 2015) and another assesses efficient passenger boarding processes (Milne & Kelly, 2014).
The methodology approach of most of articles is based on different quantitative regression models, while a few researchers are making use of qualitative approaches, including interviews and analysis of annual reports.

Articles with a focus on airports: These are mostly concentrating on capacity utilization, such as runway efficiency (Hancerliogullari, Rabadi, Al-Salem, & Kharbeche, 2013) and general capacity bottlenecks at airports due to projected increases in future air traffic (Gelhausen, Berster, & Wilken, 2013). However, articles also include potential alternative solutions to increased traffic by developing multi-airport systems to accommodate capacity challenges (Vanderschuren, 2014). One article evaluates the security checks applied to passengers based on passenger types and process times (Kirschenbaum, 2013), while another article assesses key airport service areas to determine their role in increasing the overall service performance (Lupo, 2015). The analytical approach is based on quantitative approaches, but also includes qualitative methods such as ethnographic and video recording.

Articles with a focus on passengers: Another key focus of selected articles is research on consumer behavior. One article evaluates the online behavior of consumers when purchasing airline tickets (Escobar-Rodriguez & Carvajal-Trujillo, 2013), while another article addresses the link between consumers' perception and the choice of airline based on a given environmental image (Hagmann, Semeijn, & Vellenga, 2015). An evaluation between passengers' expectations and airline service levels and perception has also been researched (Hussain, Al Nasser, & Hussain, 2015). Lastly, an evaluation of different passengers forecasts and proposes methods based on artificial intelligence (Xiao et al., 2014). Again, in line with the above overview, most of these articles are based on quantitative methods.

Based on this overview of the top 25 most cited articles in the *Journal of Air Transport Management*, I will argue that the analytical method based on quantitative approaches is primarily in line with the conventional perspectives on aviation as introduced above

In addition an understanding of the analytical approach often used in *Journal of Air Transport,* I will in the next section try to understand how hub airports are researched.

Overview of conventional aviation research approach to hub airports

I have used *Journal of Air Transport Management* as the basis for my overview research approach to hub airports due to the prior arguments. In the section below, I will argue that hub airports researched in the largest and oldest aviation journal are generally viewed as neutral traffic points with a limited analytical reference to the society the hub airport is located within. The research often make use of quantitative analytical approaches, where the airports are numerically evaluated either in terms of production performance (e.g., capacity) or in terms of output performance (e.g., connectivity or financial strength). Rarely are the hub airports understood or evaluated using qualitative methods.

My focus has been to evaluate how hub airports are understood within the conventional aviation research. My overview is based on a search for "*hub*" or "*hub airports*" within the *Journal of Air Transport Management*, with a result of 632 articles. I further narrowed the search by only including articles in which the word "*hub*" is part of the title or the abstract; by this limitation, I identified 133 articles to review. Articles are located: May 3 2018.

Based on a review of title and abstract, I categorized each article based on these categories: Theme, Method, Quantitative or Qualitative, Perspective and Focus. An in addition assigned attributes to each category. Below is an example of categories and assigned attributes.

Article #	Theme	Method	Quantitative or Qualitative	Perspective	Focus	Authors	Title	Abstract
1	Capacity	Operational analysis	Quantitative	Closed system	Airport	Bojana	The difference b	Abstract: Airport air
2	Marked (LCC)	Econometric	Quantitative	Closed system	Airline	Ruowei	Competitive resp	Abstract: This paper
3	Financial perf	Financial benchmark	Quantitative	Closed system	Airline and Airport	Charles	The impact of air	Abstract: This paper
4	Financial perf	Benchmark: Optimiz	Quantitative	Closed system	Airport	Donald	Revenue and op	Abstract: Historically

Table 1: Example of assignment of themes and attributes to 133 articles in Journal of Air Transport Management. Selection of articles based on articles with the word 'hub' present either in title or abstract (own creation).

The category: Theme have attributes such as: '*Capacity*, '*Airport performance*' or '*Airline business models*', while category: Method have attributes such as: '*Econometric*' or '*Operational analysis*. Based on attributes assigned to the category Method, I evaluated whether the primary analytical form is '*Quantitative*', '*Qualitative*', or a combination of both. Within the category: Perspective each article is evaluated as '*Closed system*' or '*Open system*'. The Theme: Perspective is a difficult

to assign attribute, since it requires strict definitions and a thorough understanding of the article. I have assigned '*Closed system'* to articles that tend to have a narrow focus on only the aviation system with its primary actors: Airline, Airport and Passengers, or a combination of those aspects. The assignment of '*Open system'* attribute is assigned to articles that include a wider scope of stakeholders in the analysis. This distinction between '*Closed system*' or '*Open system*' can be discussed since some econometric analysis include GDP or the density of inhabitants in the airport region. By my definition above, these articles should then have an '*Open system*' attribute, but it depends on the context of the article, whether I have assigned the article with an attribute of '*Closed*' or '*Open system*'. Finally, in the category: Focus, evaluated the primary focus of the articles. I have chosen the attributes: '*Airline*', '*Airport*', '*Society*' and '*Passengers'*, or some combination of these, if it seems appropriated. An example of a review article where the focus of the article was assigned with an '*Airline*' designation is the article: "Competitive responses of an established airline to the entry of a low-cost carrier into its hub airports" (Chen, 2017). Other articles could in the category: Focus be assigned the attribute: '*Airline and Airport*', where the focus is how these relate, such as the article: "Airline delay management problem with airport capacity constraints and priority decisions" (Santos, Wormer, Achola, & Curran, 2017). Further, there are some articles where the primary focus is only the hub airport – and therefore assigned with the attribute: '*Airport*', as in the article: "Evaluation of level of service for transfer passengers at airports" (de Barros, Somasundaraswaran, & Wirasinghe, 2007). In addition to these attributes to the category: Focus, the attribute: '*Society*' is assigned, if the focus of the article relates to wider societal relations, such as externalities.

The review of articles related to hub airports is only based on title and abstract, which limits a deeper understanding of the details in the articles. Therefore, these grouping of articles may be associated with some discussion, but due to my purpose for this overview and understanding how hub airports are researched, I evaluated groupings of the articles as a good indicator that supports my argumentation of how conventional aviation research to hub airports is approached.

Below is a short summery of the focus areas and the different methodologies applied in the 133 articles I reviewed.

Reviewed articles - focus areas and research methodologies

Focus	Quantitative	Both	Qualitative	# of articles
Airport	24	0	2	**26**
Airline and Airport	41	1	0	**42**
Airport and Society	8	2	0	**10**
Airline	47	3	0	**50**
Airline and Society	0	1	2	**3**
Passengers	2	0	0	**2**
# of articles	**122**	**7**	**4**	**133**

Table 2: Overview of reviewed articles related to hub airports from Journal of Air Transport Management. Selection criteria as stated in the text. This illustrates that most of the methods used are based on a quantitative approach and the research tends to focus on airports and airlines. A wider societal perspective is not often applied (Own creation).

As illustrated in Table 2, most of the articles rely on quantitative methodology. The rest of the articles draw on either both approaches or only qualitative methodologies. Based on this, it appears that most research - in the largest and oldest aviation journal – related to hub airports, either directly researched or in association with airlines, predominately make use of one-dimensional quantitative research methods such as operational analysis, financial performance, statistical analysis or econometric. Most of the research has a focus on the key actors: airports and airlines individually or together in various forms. There is little focus in the research on how hub airports are imbedded within society or how the hub airport is a consequence of historical development. This is in line with the quotes by Whitelegg and Jensen as I referred to in the start of this chapter: stating that conventional aviation research are tend to have a quantitative approaches based on a "*rational mobile person"* and '*predict and provide'* thinking. In the next chapter, I will elaborate more on Aeromobilities, that focuses on the production of aviation based on a wider societal foundation.

Danish research on aviation

In addition to international research on aviation, there are within the Danish research environment only a few researchers with a focus on aviation. Based on a review of the Danish transport conference *Traffic Days at Aalborg University*[20], between 2005 to 2017 I have only identified 11 research projects with a focus on aviation that have

[20] Own translation of: "Trafikdage på Aalborg Universitet"

been presented[21], and three of these projects were produced by consulting companies. In contrast, to the total for almost 1.000 presentation of all kinds of transport research presented at *Traffic Days at Aalborg University* (2005-2017), the focus on aviation research is quite limited among researchers in Denmark.

Beside, the Danish aviation research articles, there have been a few public publications related to public Danish aviation policies. I will elaborate in these in section: Policies and in section: 12.5 The Policies Dimension.

Research on economic effects linked to aviation

Another research area within the aviation is how aviation in general contributes economic to society. Aviation researchers have argued that aviation is vital for the development of business, tourism, and globalization (Button & Taylor, 2000, p.209). As a result, there has been increasing attention toward understanding the coefficients or relation between connectivity and economic growth. Research into aviation connectivity and the related economic benefits for society has increased over the last decade. Some of the first research on US cities focused on a causality between air connectivity and regional development (Air Transport and Regional Development (ATARD), 2014, p. 4). This research was conducted by Ndoh and Caves in 1995, and they found that there was a positive relation between air-transport supply – with a three- to six-month delay – on demand for such service (Ndoh & Caves, 1995).

The impact of aviation has often been evaluated in relation to effects on economics (contribution to GDP or income) and employment. These effects can often be divided into direct, indirect, induced and catalytic effects. Direct effects are related to effects from employees at airports and airlines. Indirect effects are generated within the suppliers to the airport, while personal spending by people from the direct and indirect categories are labeled as induced effects. The latter, wider spinoff effects in society – such as hotels and tourisms - are labeled as catalytic effects (Goetz, 2015, p. 369).

[21] By a review of the programs (2005-2017) of the Traffic Conference: Traffic Days in Aalborg, Denmark, I have identified 11 presentations with a focus on aviation: "Da Thisted gik i luften" (Claus Lassen, AAU, 2013); "Internationale rejsende i Aalborg Lufthavn" (Claus Lassen, AAU, 2016); "En ny international flyrute - hvor kommer de rejsende fra?" (Claus Lassen, AAU, 2016); "Danskernes lange rejser i 2010-11" (Linda Christensen, DTU, 2014); "Klima effekten af danskernes rejser" (Linda Christensen, DTU, 2017); "Flytrafik til og fra Danmark" (Linda Christensen, DTU, 2013); "Dansk Luftfart 2015" (Mette Bøgelund, COWI, 2006); "Luftfarten i Skandinavien, værdi og betydning" (Mette Bøgelund, COWI, 2005); "Flypassagers tidsværdier" (Mette Bøgelund, Inventive partners, 2009); "An understanding of how aviation is handled in Helsinki and Finland" (Jens Bloch, AAU, 2016) and "Hvor mange regionale lufthavner trenger vi?" (Thor-Erik Sandberg, Handelshøgskolen i Bodø, 2008).

These are harder to measure and have less causality in relation to the other effect categories (Goetz, 2015, p. 371) (see also: (Bloch & Lassen, 2016)).

There is much empirical evidence that aviation generates and stimulates economic development (Brueckner, 2003; Green, 2007; Mukkala & Tervo, 2013), although the direction of the causality between aviation and economics is context-dependent and can be discussed. The impact also differs as one analysis indicates that within service-related industries, where a 10% growth in number of passengers will increase employment by 1%, while this increase in passengers will have no job effect on manufacturing or other goods-related industries (Brueckner, 2003) (see also: (Bloch & Lassen, 2016)).

The above-mentioned research projects indicate that there is a strong link between aviation and economic development and serve to illustrate how conventional aviation research tends to use qualitative econometric and statistical models. The purpose is to evaluate relations such as elasticities and coefficients between geo-economic input variables, for example GDP or import or export data, and industry related outputs variables, for example passenger volumes or connectivity (Burghouwt & Dobruszkes, 2014).

Beside the academic quantitative approach to aviation, there is a significant number of reports produced by consultants and companies each year that focus on aviation or airport development.

Over the years been published consultancy reports by ACI Europe[22] that estimate the quantitative output such as GDP and employment from the European aviation industry. The reports quantify that airports and aviation have a significant impact on GDP and employment due to connectivity, which enable business and tourism development along the ability for increased social coherence. On next page is a table that summarizes the societal economic impact of European airports.

[22] Among others, these consultancy reports as I refer to here are: *The social and economic impact of airports in Europe* by York Aviation (ACI Europe, 2004) and *Economic Impact of European Airports* by InterVistas (ACI Europe, 2015b). Both reports are prepared for and published by ACI Europe, and therefore the publications are focusing on airports. ACI Europe (Airport Council International) is an interest group representing 500 airports in 45 European countries See: https://www.aci-europe.org/

Economic Impact of European Airports: Total Europe						
		Direct	Indirect	Induced	Catalytic	Total
Job	[#]	1.696.200	1.353.100	1.401.100	7.893.500	**12.343.900**
Income	[bn. DKK]	511	298	286	1.561	**2.655**
GDP	[bn. DKK]	757	519	569	3.179	**5.025**
% of Total GDP	[%]	0,6%	0,4%	0,5%	2,6%	**4,1%**

Table 3: Example of a quantification of aviation contribution to Job, Income and GDP in Europe. The data is produced by the consultancy company InterVistas, but prepared for ACI Europe, which is the largest interest group for airports in Europe (ACI Europe, 2015b).

These consultancy tend to use some of the same quantitative approaches, but in contrast to academic research, it can be argued that the reports often have a specific agenda to promote such as the societal benefit for a given industry. An example of such reports would be related to the ongoing debate in the London region concerning where to build an additional runway. Both Heathrow and Gatwick airports are promoting their arguments for an extra runway by numerous consultancy reports intensively arguing for why they should be the airport to be allowed to build an additional runway[23]

2.5 LIMITATIONS WITHIN CONVENTIONAL AVIATION RESEARCH

As stated in the beginning of section 2.3 Conventional Aviation Research, the conventional aviation research tends to rely on a positivist paradigm with a law-seeking agenda. This is supported by my two literature overviews of the conventional aviation research areas and research on hub airport in the previous section.

Conventional aviation research often explains air transport development as the size of the catchment area and the number of seats supplied to the market. As Suau-Sanchez, Burghouwt, and Pallares-Barbera state: *"Insight into the nature and size of the catchment area is important. The size of the originating market is a significant determinant of airport performance, in terms of its attractiveness to airlines, traffic throughput, connectivity and seat capacity offered"* (Suau-Sanchez, Burghouwt, & Pallares-Barbera, 2014).

Another example of such an approach is the way ACI Europe illustrates the relationship between GDP and connectivity[24]. As illustrated below, there seems to be a strong link between development in national productivity and connectivity. As

[23] Material the promotes each airport for having an extra runway: London Heathrow: https://www.heathrow.com/company/company-news-and-information/airports-commission/our-reports and Gatwick: http://www.gatwickobviously.com/downloads

[24] Connectivity is a measurement for how well-connected an airport is. There are different methods to calculate connectivity – further see section 5.3 Data Within an Open System

illustrated, some countries are outperforming this trend, while others are below the trend line.

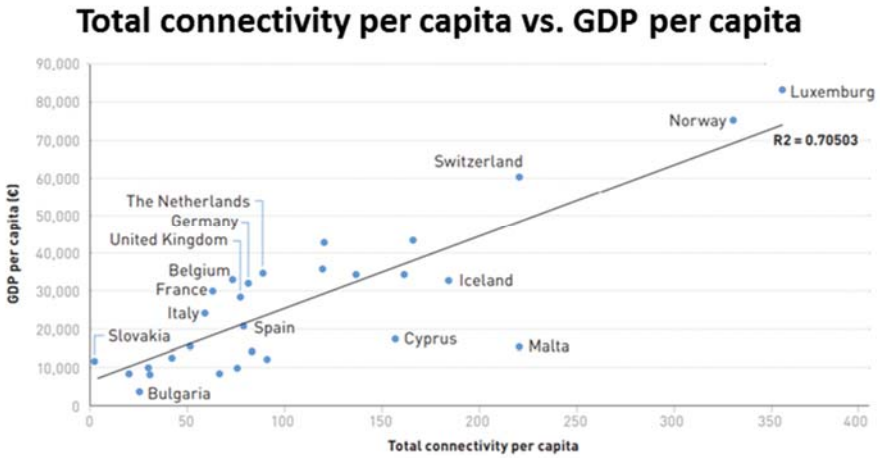

Figure 6: Illustration of the correlation between connectivity and GDP per capita in European countries, indicating that there is a relation between GDP for a country and connectivities (ACI Europe, 2014, p. 9).

As highlighted previously in this sections, most of the approaches, whether academic research or consultancy reports, tend to analyze situations by using quantitative data and different statistical models, as Burghouwt and Dobruszkes state:

> "*Several authors have developed regressions in an effort to describe variation in the supply or demand for air transport as a function of geo-economic and airline industry related variables …. Of course, there are deviations from the models, meaning that numerous cities generate more or less flows than expected." (Burghouwt & Dobruszkes, 2014, p.604-605)*

As Burghouwt and Dobruszkes indicate, there are elements that the statistical models do not explain. Such deviations can be related to the industry's contextual setting in society, which is not necessarily addressed by the different conventional analytical approaches. Burghouwt and Dobruszkes state that the different performances can also be related to factors that are not included in the models. Such additional drives could include:

1) *"Local, regional or national factors not included into the models may explain part of unexpected levels of airline flows. For example, a city with lots of immigrants keeping up links with their home country generates significant airline flows." (Burghouwt & Dobruszkes, 2014, p. 605)*

2) *"On the other hand, successful strategies by public and private actors (airlines, local and national public authorities, airport managers) who try to overcome the constraints of the local market size may also generate more airline flows than expected." (Burghouwt & Dobruszkes, 2014, p. 605)*

As indicated by these two examples, there are many drivers behind aviation development and there is a large degree of relationship between catchment area, GDP and aviation connectivity, but there are also other important elements such as airline strategy, infrastructure, governmental policies, market access and geographical location. Besides these important aspects, technological development and geopolitical situations are also influential on aviation development. Most of these elements are found within society, which means that in order to understand the development of aviation, additional societal perspectives need to supplement the conventional aviation research.

Examples of other drivers than socio-economic and airline industry related variables that affect the development of aviation could be technological or geo political developments. Along with the development described above, the aviation industry's evolution has been driven by technological developments, especially in aircraft performance. These developments have led to larger aircrafts and relatively lower weight and improved engines, which have increased operational flight distances at a lower operational cost. In 1974 Airbus A300 had productivity[25] of 19.8 ton km/flying hour and a A380 in 2007 had productivity of 52.5 ton km/flying hour, which is a productivity increase of 165% over 33 years (Doganis, 2010, p. 9-10).

In relation to the other variable; geo politics, this paragraph illustrates that development of aviation largely also is depended on international politics. In the second half of the last century, the route between Europe and Japan was one of most traveled routes in world. There were three primary routes between Europe and Japan at that time: the Southern route with stops in Turkey, Iran, Pakistan, Thailand and Hong Kong; the Polar route with one stop in Anchorage, Alaska; and finally the Trans-Siberian route with a stop in Moscow.

The Southern route is the longest and most inconvenient due to the multiple stopovers, while the Polar route first became operational in the late 1950s with SAS as the first airline to make use of this route with a Douglas DC-7 aircraft (Scandinavian Airlines, 2008). The Trans-Siberian route over Russia is the shortest route, but due to the political situation in the USSR at the time, it was a challenge for foreign airlines to get overflight rights. First in 1970, the Trans-Siberian route was inaugurated from London and Paris to Tokyo with a stopover in Moscow; the route was initially operated by Aeroflot and JAL and later also by other European airlines. Even though

[25] Aircraft productivity here: Payload measured in tonnes multiplied with flying speed.

this route was available, it was not until the 1980s that the Soviet Union allowed airlines with western-manufactured wide-body aircraft to cross its territory. Consequently, the Polar route was more attractive due to the advantages from wide-body aircrafts and the potentially challenging service in the USSR (Gidwitz, 1980, p. 179-184). In 1983, Finnair was the first airline to fly direct from Helsinki to Tokyo; this was possible due to a modification of aircraft with extra fuel tanks (Finnair, 2016b). This was the beginning of traffic along the Polar route without stopovers at Anchorage

Clearly, technological developments and geopolitical situations have a direct impact on aviation. The development of aircrafts with longer operational performance and the political climate in USSR[26] has affected how the connection between Europe and Japan developed and how the Anchorage airport became less central in this important traffic flow.

2.6 EPILOGUE

This chapter focuses on the role of hub airports as part of the aviation system and explains how the airport's role within society has changed due to structural changes within the industry. In the last three sections of the chapter, different aspects of conventional aviation research are addressed, indicating the conventional research tend to use qualitative analytical approach based on a universal and positivistic foundation, where the hub airport is understood as passive neutral traffic points facilitating capacity in terms of service and connectivity in closed system including airlines, passengers and airports.

The chapter highlights that the aviation industry is complex and includes multiple actors and stakeholders. After development of military and commercial aircrafts, there was a need to establish different international regulatory regimes for safety reasons and to have common guidelines in place to handle aeronautical flying activities. International organizations such as ICAO and IATA were, and remain, a part of this process.

Throughout the 1970s to the 1990s, the aviation industry underwent significant structural changes as a consequence of liberalization. In addition, some airports was part of a wider privatization process of national owned companies – which I will elaborate on in section: (6.2 Governance). Traditionally, the airline companies were state-owned entities, but with the liberalization process that began in the US and later

[26] Even though Russia have open up its airspace to foreign airlines, Russia have not signed *International Air Services Transit Agreement* from 1944 which grants right to fly over a foreign country without landing. Therefore, the right to overfly Russia airspace depends on bilateral agreements. See: https://www.icao.int/secretariat/legal/Status%20of%20individual%20States/russian_federation_en.pdf. Located: 15 September 2018.

extended in the 1980s to Europe, new airline business models and ownership structures were developed, most notably the LCC carriers that challenged and changed the way people travel.

Airlines have different ways of organizing their traffic flows - in simple forms – the airlines' business models can be based on point-to-point traffic or hub traffic. The latter setup enables airports to have more connections than the local catchment area can support or attract, to the benefit of the regions of the airports. Because of liberalization and the increased competition, airlines have reorganized their networks and, consequently, some airports have had an increased hub function while others have been dehubbed.

Due to the transformation process of the last few decades, the conventional aviation research approach to hub airports is not sufficient with a one disciplinary research perspective on airports. A key consideration is that the operational function of the airport has not changed, but due to the structural changes, the airport's position within society has changed from being a passive capacity provider to its role as an active entity in the production of aeromobilities. In order to analyze and understand the situations and challenges for hub airports in Europe, a new and wider perspective and approach is needed, where fore I will argue for an understanding of hub airports in a wider context – see next chapter: 3 Aeromobilities.

This chapter has also addressed different aspects of conventional aviation research. As the literature overview suggests, the predominate focus areas are airport, airline and passengers. Further, I have argued, based on an overview of 133 articles, that hub airports tend to be researched in relation to airlines or as stand-alone entities. The research of development of hub airports in relation to society is not as developed as other focal points. In addition to this, I have argued that most of the analytical approaches tend to be based on quantitative techniques. Disregard of the limit research of hub airports as imbedded in society, there has been attention towards the society economic benefits – such as GDP and job effects – from aviation as a whole as illustrated by several socio-economic reports.

In the final part of this chapter, I addressed some of the limitations of the conventional aviation research, which normally does not tend to focus on all aspects of aviation development since the research paradigm mostly relied on a *"rational mobile person"* (Jensen, 2015, p. 480). Some of these limitations concern local drives for aviation, such as immigrants or strategies by public and private actors.

The key points here are that there are multiple aspects and drivers that are influencing the development of aviation and these drivers differ in scale from local drivers to global drivers. In the beginning of next chapter, I will quote Cidell, who states that airports have to be considered as more that than just pure flow machines and strong catchment areas. In addition, Cidell recognizes that the production of air transport is

not only a consequence of globalization, but also influenced by the history, governance, politics and geography of the specific place in question.

Furthermore, due to the changing framework conditions: liberalization of the aviation industry, the aviation industry has become even more dynamic, which has greatly influenced and changed the role of the airport. Therefore, I argue that hub airports needs to be understood - not as a passive infrastructure solely providing infrastructure – but as an active entity imbedded in society. The hub airports need to be understood as relational, societal and historic places. This perspective also relies on an understanding of hub airports as part of an open society system that includes airlines, passengers and airports, but also relies on local, regional and national stakeholders for the production of aviation. Consequently, this wider understanding of hub airports raises a number of scientific questions and methodical considerations that need to be addressed in order to understand and analyze hub airports.

For these reasons, the field of research needs to be extended to include new dimensions that have not yet been in focus within the conventional perspective. In order to understand this evolving field of research, a new wider and interdisciplinary approach is needed. I will seek to understand and explore the airport as a field of research through a wider theoretical perspective. I will, in the next chapter, introduce the new mobilities paradigm and the framework for aeromobilities. Further, in the Chapter: Theory of Science, I will elaborate on the understanding of an airport and how to address this field of research.

3 AEROMOBILITIES

> *"The material processes of globalization place certain demands on the air transportation network, leading to calls for increased capacity in a variety of places. However, it is the individual characteristics of those places – their history, governance, politics, and geography – that determine whether and how the demands for capacity will be met."(Cidell, 2006, p. 652)*

3.1 PROLOGUE

In the previous chapter, I have argued that the role of the hub airport is changing due to structural changes in the aviation industry. I have argued that the conventional aviation research mostly views hub airports as a neutral, stand-alone business providing capacity for passengers and goods in the aviation industry. Predominately, the conventional aviation research does not encapsulate all dimensions of what makes a hub airport. Therefore, the methods and approaches used in the conventional aviation research are insufficient to understand the hub airport and what makes it possible. Therefore, I will begin this chapter with a foundation in the new mobilities paradigm argument for an aeromobilitiy approach as basis for my further analysis and approach in the forthcomings chapters. Due to the limitations within conventional aviation research, the aeromobilities' approach is needed to expand this field of research and truly understand the driving forces[27] that are affecting the production of aviation within hub airports and the creation of hub airports themselves.

From an understanding of airports as pure flow machines based on the conventional aviation research, airports are becoming increasingly strategically important within the global competition of places, cities and regions (Cidell, 2006; Hajer, 1999). Kesselring further states, "*The precondition for this [e.g.: world's political, economic and cultural organizations) is a highly developed social mobility potential, which enables individuals, corporate entities, ideas and goods to move and interconnect*

[27] As stated in the introduction chapter, I will seek to understand what makes hub airports possible. With this in mind, I will analyze my cases in order to understand the driving forces behind these hub airports. I will base my understanding of the driving forces by analyzing the open systems through the lenses of Policies and Materialities. With this set of lenses, I will seek to understand the driving forces through:

- Dynamic causalities within the open system, and
- Discourses along rationalities or meanings that motivate this system.

Later I will elaborate on the dynamic causalities and rationalities or meanings later in chapter 4 Theory of Science and the lenses of Policies and Materialities in chapter 6 Understanding Airports Through Governance: Policies and Materialities.

globally. Airports are the interfaces between the territorial and the global spaces in which this movement takes place." (Kesselring, 2009, p.40)

In line with this, I will argue that the production of hub airports and the process of aviation development need to be understood as a relational and dynamic process with and within society, and that consequently the production of aviation is increasingly influenced by how the hub airport positions itself within this nexus of regional, national and global controversies. In order to embrace this understanding of airports, the field of research needs to be expanded to include these dimensions.

From being understood as neutral traffic points that provide capacity, airports are increasingly involved in production mobilities. Regional Route or World Route conferences are an example of this development where airports and airlines conduct "*speed dating*" meetings in order to develop or maintain business relations (Humphreys & Francis, 2016, p. 104). This is an example of how airports no long just provide capacity to the air transport flow, but rather play an active role in its production.

3.2 THE NEW MOBILITIES PARADIGM

In 2006, Mimi Sheller and John Urry published an article, *"The new mobility paradigm"* (Urry & Sheller, 2006), based on a range of articles discussing and contributing to a new paradigm focusing on mobilities. The paradigm is founded on contributions from various scientific fields, including "…*anthropology, cultural studies, geography, migration studies, science and technology studies, tourism and transport studies, and sociology*" (Urry & Sheller, 2006, p. 208). The perspective is elaborated upon in Urry's book *Sociology Beyond Societies: Mobilities for the Twenty-first Century* (2000), in which he calls for a whole new multidisciplinary mobility-oriented social research agenda see: (Urry, 2000).

In contrast to the conventional approach to transport, the new mobilities paradigm is opening up a broader perspective on mobilities. Current research within the transport sector tends to consider demand for travel as a black box or as a consequence of a society's income (Urry & Sheller, 2006, p. 212) (See also: (Lassen & Jensen, 2006)). In order to understand mobilities it is important to understand that "*movement is socially and materially organized and only rarely and exceptionally is it merely a way of getting from A to B as fast as possible*" (Urry, 2007, p. 59). Urry, argues that all societies address distance through various processes, but societies tend to approach these processes differently depending on different discourses of movement. Therefore, he argues, social science needs to place mobilities at the heart of the understanding of societies (Urry, 2000).

Within the framework of mobilities, these processes originate from five interdependent mobilities (Urry, 2007, p. 47):

- Corporeal travel of people for work, leisure, etc.;
- Physical movement of objects to producers, consumers and retailers, etc.;
- Imaginative travel effected through the images of places and peoples appearing on and moving across multiple print and visual media;
- Virtual travel, often in real time, transcending geographical and social distance; and
- Communicative travel through person-to-person messages via texts, letters, telegraph, telephone, mobile, etc.

The new mobilities paradigm does largely focus on how mobilities affect and are affected by social life – see also (Lassen, 2011). However, social life is not only meant as the impact at an individual level but also how societies rely on mobilities (Urry & Sheller, 2006, p. 207-208). To understand social life or society, one has to understand these various forms of mobilities systems (Urry, 2007) of how ideas, people, goods, culture, etc. are linking the world together and making it a global community. One approach to address this is through the character of economic, social and political relationships (Urry, 2007, p. 6). For the production of some mobilities, nodes or transit points are crucial, and such nodes could be "*airports, stations, motels, harbors"* (Urry & Sheller, 2006, p. 213).

In line with these different forms of mobilities, Creswell addresses different properties of this paradigm. One focus is on mobilities in differing scales, from bodily movement to global flows. Another dimension of mobilities is the differentiated politics in relation to how people, from refugees to the kinetic elite, are able to move (Cresswell, 2011, p. 552). In a 2009 article, "Towards a politics of mobility", Cresswell considers three aspects of mobility: movement, representation and practice along relations that affect the production of mobilities and distribution of power (Cresswell, 2010, p. 21). An important aspect of the production of mobilities is that it does not just happen, the production of mobilities takes place in the nexus of people and society, as Jensen highlights when he states, *"Mobilities do not 'just happen' or 'simply take place'. Mobilities are carefully and meticulously designed, planned and staged (from above). However they are, equally importantly, acted out, performed and lived as people are 'staging themselves' (from below)"* (Jensen, 2013, p. 4).

This means that in order to realize and facilitate the production and possibility of distribution and consumption of mobilities, one must rely on different Policies and Materialities, including infrastructures, economics, constitutions, legislation, and geography. A key point here is that mobilities of all kinds are vital for how modern societies are produced, reproduced and transformed and in order to understand mobilities a focus on "*identity, culture, and social norms are as much in focus as is the physical movement of objects and humans*" (Jensen, 2015, p. 484).

The mobilities paradigm has a different implication for how to analyze and understand mobilities as a society phenomenon (Urry, 2000). Instead of relying on a one-dimensional approach to mobilities, as the conventional research tends to do, the mobilities paradigm opens up and offers a wider range of research methods and perspectives. For example, conventional transport research on road congestion focuses historical mostly on quantitative throughputs. The challenge is often expressed in quantitative measures such as the number of cars per hour or hours spend in cars, which again is converted into production loss for society. Furthermore, the challenges are often addressed by an optimization process where new capacity could be added to the system. A mobilities approach to the same challenge of road congestion does not reject the given solution, but instead of adding more capacity to the system, the mobility perspective could also address other dimensions, such as focusing on different aspects of human behavior. In line with Jensen (2013) arguing that the given mobilities are a response to materialities and how people behave, due to *identity, culture and social norms.* By addressing these dimensions, it could be possible to understand and change the mobilities on the congested roads in different ways than just adding new capacity. In addition, in contrast to the conventional approach where transport time is perceived and understood as passive time and therefore as an externality, the mobilities paradigm allows for an alternative understanding of this by acknowledging that the time spent in traffic does not necessarily need to be a viewed in a purely negative form. The time spent on roads can be used for social interaction between parents and children on the way to school, telephone calls, podcasts or simply relaxing time. Therefore, the so-called "passive time" does not have to be associated as a negative outcome of congested roads. This illustrates that by understanding a situation through the multi-dimensional perspective of mobilities, new potential solutions could become viable. This new mobilities paradigm opens new ways to understand and change different mobilities, including aviation., which I will address next.

Now, after this short introduction to the new mobilities paradigm, I will in the following section focus on aeromobilities. This has emerged as a sub-field within the new mobilities paradigm, specifically focusing on aviation from a societal and interdisciplinary perspective. Aeromobilities research can have several research agendas, including how aviation development has influenced the way professional people work and the impact on their social life (Lassen 2005; Lassen 2009) or how urban business helicopters and the associated infrastructure with helipads on buildings are produced in a nexus of politics governance structures and social distribution (Cwerner, 2009a, p. 227)

3.3 THE NEW AEROMOBILITIES RESEARCH

A new focus on aviation has emerged and is under development based on the thought from the new mobilities paradigm. This aeromobilities paradigm has a wider societal perspective and sees air travel as more than just objects moving (Cwerner, 2009b; Lassen, 2004; Lassen, 2006). In contrast to conventional aviation research with a '*predict and provide'* approach, the aeromobilities paradigm is wider and embraces the dynamics between airlines, airports and society. This holistic approach is even more centrally important given the fact that airlines and airports have increasing importance in *global* (Beck, 2000), *network-driven* (Castells, 1996) and *liquid* (Bauman, 1999) contemporary societies. In addition to the economic effects from aviation previously mentioned, various airport studies indicate the importance of airports in the global economic environment (Kasarda & Lindsay, 2011) - (see also (Lassen, 2010)) - and how airports can give regions a strategic economic advantage (Cidell, 2006; Kesselring, 2009).

Aeromobilities, as a subfield of the new mobilities paradigm, makes it possible for researchers to address social networks and systems in order to understand the production and regulation of these – see also: (Bloch & Lassen, 2015). The aeromobilities research must "*…account for the complex interdependencies between different mobilities, networks, systems, institutions, risks, culture and territories"* (Cwerner, 2009b, p. 4). The research field of aeromobilities consists of a wide range of different research disciplines, such as "*…technology, community, governance, time/space, social interaction, urban development and environment, among other issues*" (Cwerner, 2009b, p. 9). By only focusing on one discipline or having a narrow disciplinary approach, there exists the risk of not embracing the complex dimensions of aeromobilities (Cwerner, 2009b, p. 9) (see also: (Bloch & Lassen, 2016)).
Aeromobilities is a relatively new approach to the study of mobilities. Therefore, the development of the research agenda is limited. The list below illustrates some of the research elements that have earlier been argued as key elements of aeromobilities research (The listing is based on (Bloch & Lassen, 2016; Cwerner, 2009b)):

First, research within aeromobilities needs to be transdisciplinary and include aspects of technology, community, governance, time/space perceptions, social interaction, urban development and the environment. By focusing on only one of these dimensions, the research will have a challenge to cover the complexity of aeromobilities (Cwerner, 2009b, p. 9).

Second, research within aeromobilities must also embrace a variety of empirical fields due to the various elements that affect these mobilities. Aeromobilities contributes to different local and global externalities, such as local noise challenges and local and global CO2 emissions (Graham, 2003, p. 220), in order to facilitate an understanding of the social dimensions of globalization. To produce an understanding of the driving forces behind aeromobilities, the research should rely on numerous empirically-

studied fields, such as safety and security; various airline and airport systems; and international, national and local governance in relation to traffic policies and regulations. It is important to have a multi-faceted approach since it can be difficult to evaluate externalities without a perspective on how aeromobilities produce social coherence in a local or global context. Furthermore, it does not make sense to evaluate the different security or safety systems that are supporting aeromobilities without an integration with and discussion of contextual relation to international and national governance and politics (Cwerner, 2009b, p. 9).

Third, aeromobilities, in light of their complexity and fascination, tend to focus on airports, airlines or destinations. Despite the importance of these key elements, it is valuable to also develop an understanding of the impact of air travel on everyday life and how this facilitates new ways of living and social interactions. Topics of research can included areas of people's willingness to use or withhold them from using air transport and the drivers for air travel such as people's dreams, plans and work relations (Cwerner, 2009b, p. 9-10).

Fourth, besides the focus on and understanding of how aeromobilities impact and interact with people's everyday lives, aeromobilities also have a significant influence on how information, culture, goods, etc. are distributed across the globalized world (Cwerner, 2009b, p. 10).

Fifth, aeromobilities facilitate and contribute to segmentation and differentiation of people based on how systems are interacting with the individual. This differentiation can be based on various dimensions of social life such as "*…economic, gender, ethnic, racial, age, [and] physical ability*" (Cwerner, 2009b, p. 10). It is important to stress that aeromobilities are able to and do produce equalities and inequalities among people regarding the way that they travel. These inequalities come in different forms, but dimensions such as increased security and surveillance tend to differentiate people (Cwerner, 2009b, p. 10-11).

Despite these historically well-positioned research agendas, there needs to be an additional research agenda that has a limited focus, both within the conventional aviation research and aeromobilities. With a point of departure in aeromobilities thinking, I will develop a research agenda focusing on how aviation is spanned out in society, meaning how aviation is understood and produced in the context of stakeholders and other drivers, including the rationality behind the complex industry of airports and aviation. In my theoretical Chapter: 6 Understanding Airports Through Governance: Policies and Materialities, I will argue for a model based on a governance approach to hub airports in light of different Policies and Materialities in order to understand the production of aeromobilities. I will use this theoretical governance approach to gain knowledge about how airports are imbedded within society and how this is linked to different local, regional and global materialities.

After I have presented and illustrated both the conventional aviation research agenda towards aviation and aeromobilities, I will shortly illustrate and summarize the different concepts and approaches within the two research agendas (Please be aware of limitations such duality always includes). It is important to stress that I will not argue for aeromobilities as a replacement of the conventional approach, but as a supplement that can unbox some new dimensions to the understanding of the hub airport and the production of aeromobilities.

	Conventional aviation research	Aeromobilities research
Research approach	Focus on one discipline	Interdisciplinary
Focus	Evaluate and predict flows in order to facilitate proper capacity	Understand the production and consumption of aviation
Methods	Models and forecasting	Different qualitative, quantitative and visual methods
Theoretical foundation	Forecasting Physical mobility Aviation object from A to B	New mobilities paradigm Physical aviation mobilities together with different mobilities aspects
Actors and system in focus	Closed systems with airlines, passengers, and airports	Open society systems with airlines, passengers, airports and other stakeholders
Place	Neutral traffic points	Focus on relational and historic place

Figure 7: Illustration of different approaches between conventional aviation research and aeromobilities (G. R. Larsen, Jensen, Lassen, & Laursen, 2016, p. 16) – see also: (Larsen & Lassen, 2017).

3.4 WHAT IS AN AIRPORT FROM AN AEROMOBILITIES PERSPECTIVE?

Airports can and should be understood from an aeromobilities perspective. As stated previously, the conventional perspective on airports tends to rely on a positivistic rationality, where airports are understood as neutral places for global flows of people and goods. This is addressed by Augé, who draw parallels between airports and other generic places such as shopping malls, service stations, and super markets, that have been characterized as placeless or as non-places (Augé, 1995, p. 94) found in (Urry, 2007, p. 146). This claim is based on a development and design approach where a generic global expression is the foundation for the development of airports. This generic design is related to a common sign language and common experiences (Urry, 2007, p. 146). However, Urry argues that airports are not a non-place. Airports constitute complex systems, both in relation to passenger flows that are facilitated by material layout and sign systems, but also due to other design intentions such as markering. As airports, for different competitive reasons, have a motive to stand out from their competitors, airports tend to be redesigned to have identity or brand awareness relating to local attractions (Urry, 2007, p. 148).

As addressed previously, to have mobilities, fixities or moorings are important. Airports constitute such a function. Cresswell states that in order to understand the current mobilities, it is important to keep an understanding of *"…fixity, stasis, and immobility in mind"* (Cresswell, 2010, p. 29) or "*[Critical Points of Contact that are] sites or nodes where different system meets*" (Jensen & Morelli, 2011, p. 37). Kesselring elaborates on these moorings, fixities or nodes in relation to aeromobilities since there are some challenges towards developing these kinds of infrastructures:

> *"One the one hand, airports are interfaces with global space; they stabilize the cosmopolitan mobility potential of the mobile risk society by providing the logistic infrastructure for the acceleration and global coordination of organizational processes in business and society. But, on the other hand, airports are territorial and thus bound by social, economic and political norms of their location. They cannot develop independently – hence … the importance of the neighboring local level. Regional forces often shape the planning stages of airport projects, especially so when expanding capacity is the issue. The resistance of neighboring residents can influence such operating parameters as take-off and landing directions, night operations, etc." (Kesselring, 2009, 48-49).*

One important element that Kesselring points out is that airports are embedded in social, economic and political norms of the place where they are located; and this is in line with Urry's argument that an airport cannot be considered as a non-place. The drivers pointed out by Kesselring demonstrate that airports need to be understood as more than just pure flow machines or non-places that exist outside the normal sphere of society see: (Eriksen & Døving, 1992)

In line with the conventional perspective, aeromobilities also focuses on externalities, but in addition to evaluating these on a quantitative dimension, aeromobilities opens up the analysis to a qualitative approach to understand these externalities as interrelated. Kesselring points out some of the externalities[28] for aeromobilities when: "*The structuring influence of global mobility is especially apparent in discourse on its negative side effects. Controversies over airport noise, environmental pollution, land use, etc., affect the configuration of political, economic and societal networks in the territorial context*" (Geis, 2005) found in (Kesselring, 2009, p. 49).

Lassen and Galland open up a wider understanding of the relationship between aviation and airport location by addressing the externalities for the local region surrounding Mexico City International Airport. They stress that the growth of aviation

[28] Often aeromobility researchers will maybe use other terms for externalities such side effects or dark mobilities, however in this thesis I stick to the term externalities as a way of describe the side effects of aeromobilities.

needs to be understood not only by increases in connectivity, but also through a wider understanding of the "*…existing relations between social, spatial and environmental consequences*" (Lassen & Galland, 2014, p. 149).

The externalities can have different dimensions: some are local, i.e. those related to land use, pollution and noise. Others have a more global dimension, such as worldwide pollution, and a view of the aviation industry as an enabler of sickness in a mobile world where historically regionally-locked viruses such as SARS become a global risk (Schillmeier, 2008).

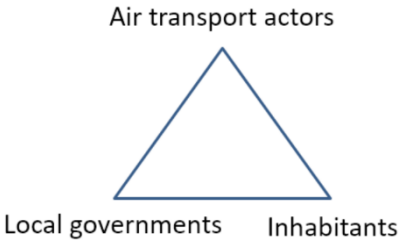

Figure 8: Scheme of contradictory positions between actors (Faburel, 2003) found in (Kesselring, 2009, p. 50).

This focus on local externalities is sometimes referred to as NIMBY (Not In My Back Yard) (Kesselring, 2009, p .49). The conflicts between an infrastructure – such as an airport – that provides a benefit for society, but no one are willing to have it located near where they are living due to the local externalities such as noise or pollution. In relation to aviation and globalization, Kesselring states that globalization leads to conflicts of interest since the expansion of networks tends to require more urban space and therefore a conflict between locals or other stakeholders often ensues (Kesselring, 2009, p. 49). Kesselring refers to Faburel, who illustrates the contradictory position between these actors:

The relationships between the air transport actors, local governments and inhabitants is not isolated since national governments also have an interest in providing solutions to these challenges (Kesselring, 2009).

The relationship between externalities and aviation is not the only controversy associated with the development of this form of transport. There is also the focus on liberalization and the associated competition. This process causes an increased focus on production costs, including staff cost. As the President of Trade Union 3F-Kastrup in Denmark put it, "*Well, the liberalization meant uncertainty, instability, pressure on wages and working conditions, but also a kick in the ass for some things to get better,*

but this is how development is" (President, Trade union, 3F-Kastrup, 2017: 6:23 – own translation[29]*).*

With an understanding of an airport as a historical and relational place and an important element in producing aeromobilities, there is a need then to understand an airport in relation to these contexts. As Adey argues, airports are embedded "…*within local and national cultures, histories and uses*" (Adey, 2006, p. 360). This local context dependency is also stressed by Roseau as she argues against "…*seeing airports as simply evidence of standardization wrought by globalization and aims instead to re-localize airports in their specific cities' histories. … as a way to re-contextualize the airport topic both in a temporal and spatial framing*" (Roseau, 2012, p. 35).

As illustrated in this chapter, the production of aeromobilities takes place in a nexus of controversies between different spatial scales and actors. The development of the new research agenda, as suggested above, relates to the governance of these dynamics and therefore the development of this agenda is necessary for understanding the drivers behind the production of aeromobilities in contemporary society.

3.5 EPILOGUE

In this chapter, I introduced the new mobilities paradigm and its subfield: Aeromobilities. These positions are founded on contributions from different scientific fields such as "*anthropology, cultural studies, geography, migration studies, science and technology studies, tourism and transport studies, and sociology"* (Urry & Sheller, 2006, p. 208). This approach to mobilities relies on a wider societal perspective and understanding movement as more than just objects moving from A to B; the understanding of mobilities is associated with socially and material interactions on different scales. In order to understand the societies there is a need to understand how ideas, people, goods, and culture are linking the world together and making it global. In these flows, moorings, and this case airports, are essential as node or transit points. Consequently, airports are increasingly important in terms of local, regional and global competition between regions.

To understand this complex research field of aeromobilities, different research techniques must be applied, including interdisciplinary research dimensions of "*technology, community, governance, time/space, social interaction, urban development and environment, among other issues*" (Cwerner, 2009b, p. 9). These approaches are different to the conventional aviation research perspective that tends to be based on a positivistic law-seeking approach, with a focus that tends to be

[29] Own translation of Danish quote: "Jamen [liberalisering betød] usikkerhed, ustabilitet, pres på løn og arbejdsvilkår, også spark i røven til at nogle ting kan blive bedre, men det er udviklingen sådan i det hele taget" (President, Trade union, 3F-Kastrup, 2017: 6:23).

quantitative in closed systems. In line with this, the conventional aviation research often addresses airports as neutral traffic points. This perspective has many benefits in terms of understanding different universal correlations and estimations of different effects, but the aeromobilities perspective can supplement this view by adding other understandings of the different scales of complexity with the production of aviation.

Based on these considerations, I will argue for a new way of understanding airports based on perspectives from aeromobilities:

- First, airports need to be understood as a node in a global flow of ideas, people, goods and culture, not only as a transition point of physical objects.
- Second, airports need to be understood relational to history and their role in the social, economic and political aspects of society in the light of local, regional and global controversies. Different scales of local externalities to the global challenges of pollution and epidemics in relation to competitive advantages and economic gains must also be considered.
- Third, airports need to be understood as an active strategic part in the production of aeromobilities. Due to the structural changes in the aviation industry, airports can no longer be perceived as a passive infrastructure provider.

The research agendas within aeromobilities have had a limited focus on how the production of aviation is spanned out in societies. Therefore, in the forthcoming chapters, I will argue for a foundation of aeromobilities within the meta-theoretical position of critical realism. Based on this, I will analyze the production of hub airport across Europe based on dynamic causalities between Policies and Materialities found in discourses. Due to the controversies and scales associated with aeromobilities, I will address that from a theoretical position of governance as a platform where these different perspectives can synthesize.

4 THEORY OF SCIENCE

> *"Because events are not pre-determined before they happen but depend on contingent conditions, the future is open – things could go in many different ways."* (Sayer, 2000, p.15)

4.1 PROLOGUE

I will in this chapter argue that there is a need for a new approach to understand the driving forces that enable the production of aeromobilities. In my later theoretical chapter, I will argue for a theoretical setup where production of hub airports is analyzed through the lenses of Policies and Materialities. However, in this Chapter: Theory of Science and the next Chapter: Methodology, I will unfold the meta-theoretical position based on thoughts from critical realism and argue for a methodological approach in this thesis in relation to my theoretical setup, the problem statement and my initial problem analysis.

I will argue for a new way – or at least an additional way – to understand an airport based on the thoughts from aeromobilities 'thinking' found in critical realism. This meta-theoretical position has some implications for how to approach hub airports as a part of society, which enables a wider societal understanding of hub airports in contrast to the predominantly empirical analytical tradition that conventional aviation research tends to rely on, as argued in the previous chapter.

In the previous chapter in *Figure 7*, I did present the different perspectives on aviation research: Conventional aviation research versus Aeromobilities research. I showed that the conventional aviation research does consider knowledge as universal and context-independent. In this chapter, I will based on critical realism argue that aeromobilities need to be viewed as context-dependent and as such it will not be possible to generate a universal truth of understanding of the aviation system and the driving forces of the system. Furthermore, conventional aviation research relies on a view of the societies to be relatively constant and unchangeable, as in a closed system. In contrast to this, the aeromobilities research focuses more on an approach where systems are dynamic over time and therefore the understanding of the system changes over time. In conventional aviation research, airports are viewed as neutral places that constitute a fixed start and terminal point for movement of objects between points A and B in a global aviation system. Opposite to this, aeromobilities research argues for associated meanings or discourses related to the object in question, and therefore the airport is a subject influenced by dynamic causalities. In line with this, aeromobilities research founded in critical realism needs to be conducted using a range of

methodologies and approaches as opposed to conventional aviation research that tends to rely on predominantly quantitative methods.

Later, I will argue that the study of aeromobilities take place in a nexus of Policies and Materialities, this focuses on both patterns of meanings and structures/materialities are also the reason for chosen critical realism as a meta-theoretical position of the thesis, as critical realism bridges realism with interpretative science.

I will initially reflect on how a hub airport can be understood as a field of research within society. Among others, I will use arguments from Sayer (2000) and Danermark et al. (2002) as my basis for a new way of looking at airports, founded in critical realism.

Before I formulate the framework for a new understanding of an airport, I will shortly outline and examine the key thought and implications of critical realism.

4.2 HUB AIRPORTS IN A META-THEORETICAL PERSPECTIVE

An airport is an actor in an open system and therefore more than just a flow machine or a neutral, static place as the conventional aviation research tends to present an airport as. The airport needs to be considered as a place embedded with institutions, practices and more. The airport must be understood and researched as a unique place. There must be a gestalt shift in looking at airports.

The illustration in Figure 9 of the Rubin's vase is a strong representation of an ambiguous situation. In one view, the picture is a vase; in another view, the picture consists of two faces. It depends on where one's focus is. The idea is that the two pictures exist together and supplement each other. In relation to my research, I will argue that the conventional perspective can be represented as a focus on, for example, the vase itself as representation of the airport; and I will supplement this view by also looking at the two faces, therefore both the airport and context.

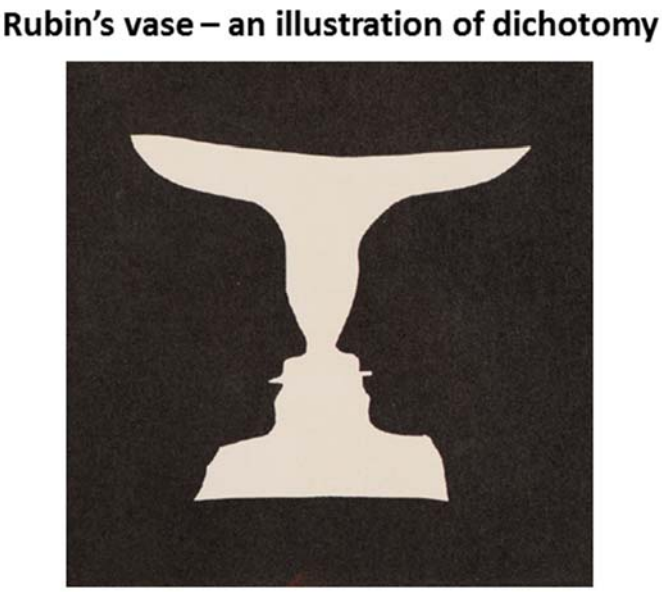

Figure 9: Rubin's vase, here used to illustrate that an airport can be viewed differently. on one side airports can be understood through the conventional approach, and on the other side the airport can be understood through Policies and Materialities (Rubin, 1915, illustration 3).

Critical realism opens up an approach to see the production of hub airports in a new light. Essential to critical realism is its ontology or its understanding of what currently exists (Sayer, 2000, p. 10). Within critical realism there are two dimensions of ontology: the intransitive dimension and the transitive dimension of knowledge. The intransitive dimension relates to the knowledge of the object in our research that is the same no matter how we understand it. In contrast, the transitive dimension relates to the theories and discourses which we apply to research on this object. Depending on which theory we use, our understanding of the object could change even though the object itself does not necessarily change.

Different theories within the transitive dimension could lead to a rivalry in understanding the object in question, though the object remains the same (Sayer, 2000, p. 10). The ontological position within critical realism enables us to understand a hub airport in a new way, as illustrated with the Rubin's vase in Figure 9. The object is still an airport within the intransitive dimension, but due to the transitive dimension, we can apply a new approach to understanding the hub airport. Even though the intransitive dimension prescribes that the object is still the same, it is important to stress that the object, regardless of the transitive dimension, can change over time.

This is often the case with institutions which, as in the case of a hub airport, can change their position within society over time due to new structures or functions. As presented in Chapter 2.1, this is the case with airports which have experienced a change in their

function as a result of a change in their framework conditions. Airports have transitioned from being a passive infrastructure to an active actor in producing aeromobilities. Regardless of this development, or perhaps exactly due to this development, there is a need for a new understanding of the drivers behind hub airports. critical realism is suitable to apply since it enables us, based on the transitive dimension, to expand and gain new insights of the object in question. Based on this on this ontology, we will be able to produce other and varying understandings of hub airports.

Critical realism imposes an understanding of an object based on dynamic causalities and an interpretive method for deriving a meaning or 'verstehen' of the system within which the airport is an actor (Sayer, 2000, p. 13-17). I will elaborate on these central standpoints later in this chapter, but before that I will shortly draw out some of the characteristics that further apply to the ontology of critical realism.

Critical realism has an ontology that indicates a distinction between the world and different understandings of it, vis-à-vis the intransitive and transitive dimensions. The transitive dimension does not rely on a one-dimensional ontology, as it for example is perceived in positivism, but critical realism sees ontology as layered, consisting of three different levels: the real, the actual and the empirical. The *empirical* domain constitutes of what we directly experience; the *actual* is what is actually happens, independent of whether or not we do our experience; and the *real* domain constitutes all elements that generally produce the event. This means that we can claim that there are structures that we have not observed (the real) or seen results of (the actual). However, due to observations of given outcomes, we will be able to argue for the existence of such structure based on experience (Sayer, 2000, p. 12). In contrast to the conventional aviation approach, which can be claimed to have a one-dimensional ontology, critical realism claims to understand the world based on the three above-mentioned ways – this is also labeled as "stratified ontology" (Sayer, 2000, p. 12).

4.3 OPEN SYSTEMS

Besides the intransitive and the transitive dimensions, including the three ways to understand the world, – the real, the actual and the empirical – critical realism relies on an ontology that focuses on open systems in contrast to closed systems. This has some implications for how we address the object in our research and the understanding of what causes something to happen (Sayer, 2000, p. 14). It is a matter of our level of viewpoint or strata - as Danermark et al. (2002) labels it – to understand whether a system is closed or open (Danermark, Ekstrom, & Jakobsen, 2002, p. 67). Natural science often approaches the field of research from a lower strata where less objectives make it possible to interfere. Therefore, the natural research setup can be considered a closed system. Natural science has a focal point used to isolate different objects in order to understand their mechanisms. In contrast to this social science, that, as

Danermark et al. (2002) states, tends to have higher strata where closed systems are not feasible to the same extent (Danermark et al., 2002, p. 67).

In line with this, aviation systems cannot be considered as a constant and closed system. The structures and mechanisms that influenced airports in the 1970s have changed due to liberalization and privatization. Therefore, it is not possible to uncritically adopt causalities from the 1970s and implement them today. To supplement this, airports are not universal across cities, regions, countries or cultures. Even though they handle basically the same universal transport system, it is not possible to conduct direct knowledge transfer without first considering the differences and similarities between the cases in question. Airport studies, therefore, need to be considered as societal systems that change over time and space. By this, airport studies differ significantly from the classic disciplines within natural science, such as physics which derives theories that are universal across time and space. In line with natural science, conventional aviation research has a tendency to evaluate systems based on statistics and outline universal truths and unchangeable causalities.

One example of this is the case with the route between Europe and Japan, as referred to in section 2.5 Limitations within Conventional Aviation Research.

The case addresses the development of the flight paths between Europe and Japan, which were dependent upon traffic rights and the possibility of obtaining these rights despite the political situation in Russia at the time. This exemplifies that the development of aeromobilities is highly context-depended and findings cannot be directly transferred to other geographic locations such as routes between Europe and South Africa due to other contextual settings, even though the distances are approximately the same[30]. This highlights that the production of aeromobilities is very much dependent on a political dimension. Further, the case illustrates that due to technological development over time, the route between Europe and Japan has changed characters since the route is no longer dependent on multiple airline stopovers for fueling and maintenance. This illustrates that the production of aeromobilities is not constant over time.

As exemplified here, the aviation system needs to be understood as an open system. Danermark et al. (2002) explains that understanding of whether a system is closed or open relies on two criteria:

1) The object in question must not change due to the impact of other objects within the system. If this is the case, the system cannot be considered a closed system since it will not be possible to isolate the mechanism of a given

[30] The distance between Copenhagen, Denmark and Tokyo, Japan is 8.734 km, while the distance between Copenhagen, Denmark and Johannesburg, South Africa is 9.178 km. Calculation based on http://www.gcmap.com/.

object. This condition is referred to as the internal condition for closure (Danermark et al., 2002, p. 67).

2) The relationship between the object in question and the relevant environment must be constant. If this relationship changes over time, the system cannot be considered a closed system. This condition is referred to as the external condition for closure (Danermark et al., 2002, p. 67).

Besides these closed or open systems, Danermark et al. (2002) argues that social science, with a focus on human behavior, can be encapsulated in pseudo-closed systems such as "*…the organization of working life, family, the educational system or the healthcare system"* (Danermark et al., 2002, p. 68). The purpose of establishing these pseudo-closed systems can be to determine some predictability or control in line with the conventional aviation research approach. Even though these pseudo-closed systems are articulated, there is a clear distinction to conventional aviation research since human nature will always change and renew itself, and therefore it cannot be considered as a closed system (Danermark et al., 2002, p. 68).

As I will return later in Chapter 9 Case – Brussels, Brussels airport was operating as a hub for Sabena Airlines, but in 2001 the airline was declared bankrupt. The bankruptcy of Sabena Airlines happened for several reasons, but one of them can be linked to the financial stress due to the large investment programs by the owner of Sabena Airline: Swissair. This bankruptcy had a major impact on the production of aeromobilities at the Brussels airport due to a significant drop in passengers using Brussels airport. This simple example illustrates that what could be perceived as a closed system for production of aeromobilities in the Brussels airport, was suddenly changed by outside dynamics. This illustrates that relatively stable causalities within a system suddenly changed, and therefore the understanding of the production of aeromobilities at the Brussels airport had to change.

4.3.1 DYNAMIC CAUSALITIES AND VERSTEHEN

As stated above, fundamental to critical realism is an understanding of what makes things happen within a system. By approaching airports as an open system, I will draw on an approach where the system consists of different structures of objects or practices. By different interrelation and causal power structures, these objects generate more than each of the objects does individually. The understanding of these dynamic causalities enables researchers to understand what causes a given outcome or what actually makes a given outcome possible. The foundation is to understand what produces, generates, creates or decides a given outcome. The potential exercise of these interrelated dynamic power structures, along with other conditions, determines the open system and the result (Lassen, 2005; Sayer, 2000).

The dynamic causality in critical realism differs from the positivistic view on causalities. Positivistic causalities are based on collecting data and identifying the mechanisms that, with largest regularity, causes a given effect. The critical realism dynamic causalities focus on "*what causes something to happen*" (Sayer, 2000, p. 14). It does not have to be interesting how many times such mechanism can be observed, but to understand what can course a given effect (Sayer, 2000, p. 14). The causalities relates to acknowledgment of a given causality between event A and event B: '*if A then B*', but the dynamic relates to the fact that even though event B is most likely, it does not always have to be the outcome, sometimes event C can be the outcome. Therefore, dynamic causalities focus on understanding what causes something to happen; this is not a universal relation, it depends on time and space.

In conventional aviation research, the focus is to identify the key causal mechanisms within the system; but instead, critical realism the focus is to understand the potential power relation between these objects whether they are activate or not, and to understand the conditions that are in place in order for them to be activated (Sayer, 2000, p. 14). Further, it is important to understand that within these open systems, the same structures of objects can cause different results, and various structures can cause the same results; it all depends on the context (Sayer, 2000, p. 15). However, it is not possible to determine how much influence the context has on any given result, as it depends on all related power structures (Sayer, 2000, p. 16).

On example of such a situation where the same objective – here airport facility capacity expansion – is in focus, but due to the contextual setting the result is different. Cidell uses an example of the capacity expansion process at the Minneapolis–St. Paul airport and Chicago's O'Hare airport in the US to draw up this dependency on contextual settings. The objective for both airports was to expand their capacity; at Minneapolis–St. Paul airport there was an open governance structure and discourse focusing on the airport as a gateway to the world, benefitting the local communities, and therefore the airport succeeded in having its facilitates expanded. Meanwhile, at Chicago's O'Hare, there was a more difficult process to have its capacity expanded. Cidell points out that since O'Hare had a nationwide perspective and did less to articulate the local benefits, the expansion plans gained less local community support, which resulted in significant delay of the expansion plans (Cidell, 2006). This example illustrates that even though different quantitative models predict a need for expansion, there are structures and mechanisms outside this system that can influence the optimization of the approach to the system.

The focus point in such an open system is not to find the direct causalities for a given outcome, but rather to focus on the necessity of the different objects within the structure by asking questions like, "*What is the precondition for this object?*" or, "*Could object A exist without object B?*" or, "*What attributes does object A have since it contributes like this?*" (Sayer, 2000, p. 16). Consequently, it will not be possible to establish a clear predictability or understanding in line with 'if A then B' for these

social processes (Danermark et al., 2002, p. 68). Therefore, I will argue in line with this, that the understanding and explanation of an airport as a social process will not enable some kind of prediction of further development due to the nature of an open system.

Retroduction is an important argumentation form in critical realism. This way of reasoning encapsulates basic questions such as "*how is a social performance or organization possible?*" or "*what characteristics have to be present for X to exist and for X to be what it is?*" Essentially, "*what makes X possible?*" (See also: (Danermark et al., 2002) for more detailed description). In this thesis, such a line of considerations articulates what makes a hub airport possible or what makes a specific successful or less successful hub-airport possible? The framing of the main research question in this thesis has been inspired by this way of thinking.

Verstehen

In addition to the dynamic causalities that influence events to happen, it is also pivotal to understand what meaning or meanings motivate these systems (Sayer, 2000, p. 17). As Urry points out, *"[a]ll societies deal with distance, but they do so through different sets of interdependent processes and these include various discourses of movements" (Urry, 2007, p. 47).*

The first argument focusing on the "*interdependent process*", will be addressed through the unfolding of dynamic causalities within the open systems, as presented in previous section. The latter argument, based on "*various discourses of movement,"* will be addressed in this section. The "*discourse of movement*" relates to the meaning of movement associated with hub airports. The meaning is not something that can be counted or measured, the meanings need to be understood through an interpretative process or "verstehen" (Sayer, 2000, p. 17).

This interpretative or hermeneutic process to understand the meaning of a given situation is a dimension where social science is different from positivist or natural science (Sayer, 2000, p. 19). The focus of interpretative knowledge is to understand how different groups look at and associate meaning with given topics in order to understand their underlying reasons of given objectives (Kivits & Charles, 2015, p. 104).

As I will presented later in 5.4 Analytical Process, I will use a discourse analysis based on articulations and practices to identify discourses and understand the meaning or rationality behind the production of hub airports. This process does not only rely on spoken word, but also on interpretation of wordings in different materials since these articulations are also linked to the rationality behind a given system. This implies that, in contrast to the conventional or positivistic research approach that seeks to *explain* the correlations, critical realism motivates for an *understanding* of *why* things happen.

Consequently, understanding the rationality or rationalities behind different systems is essential in addition to understanding dynamic causalities.

As Lassen states: Even though Sayer argues this duality of dynamic causalities and meaning, there is still often a tendency to underestimate the hermeneutic dimension in critical realism (Lassen, 2005, p. 61). Due to my point of departure in aeromobilities; the focus on aviation as embedded in society built on many different patterns of meanings, imply that it is key to combine a hermeneutical process with dynamic causalities.

4.4 EPILOGUE

Theory of science in this thesis is based on the thoughts from critical realism, which have some implication in terms of the ontology perspective on what exists. Critical realism focuses on two dimensions: the intransitive and transitive dimensions. The transitive dimension relates to our understanding of an object depending on theories applied. The transitive dimension draws on three ways of understanding the object: the real, the actual and the empirical. In line with other social sciences, critical realism addresses the field of research as an open system, which consists of different structures we must understand in order to recognize the mechanisms that are the drivers behind a given outcome. The structures within the system rely on dynamic causalities and the system is associated with rationalities, which are essential for our understanding.

Below, I will argue that the new way of understanding airports in light of the thoughts from aeromobilities research (as formulated in Chapter 3), should be founded in a critical realism approach.

I will therefore, anchor my aeromobilities research approach in the following meta-theoretical foundation – this will also guide my methodology approach in next chapter:

- Firstly, an airport is an actor in an open system which is produced by dynamic causalities between different actors being influenced by local, regional and global networks. Therefore, the airport cannot be seen as a standalone business, but as a place created through relationships with other places, actors and mobilities.

- Secondly, airports do not have a linear development though time and space. An airport is a consequence of events that are continuously developing. An airport is produced be discontinuously different events that together have formed the current situation.

- Thirdly, the system is founded on meanings or rationalities which cannot only be observed, but also need to be understood by using an interpretive understanding or ‘verstehen’.

This new way of understanding an airport has some implications for how we can address this field of research. My interest is to understand the specific context and investigate what components, relations and rationalities have supported a specific development of hub airports across Europe. What constellation of materialities, politics, strategies and organizations on a local, regional, national and global level have influenced how specific hub airports are positioned within the global flow of travelers, goods and information? This line of thought constitutes the problem statement of the thesis along the theoretical approach, and is guiding the development of the specific design of methodology, which I will present and argue for in the next chapter.

5 METHODOLOGY

> *"Aeromobilities research needs to be transdisciplinary (or post-disciplinary). Social scientists will at their own peril ignore developments in their neighboring departments. Although this may now hold true for any social research endeavor, perhaps on other field of enquiry requires more attention to the complexity of human life than aeromobilities research." (Cwerner, 2009b, p. 9).*

5.1 PROLOGUE

Understanding the role of a hub airport in the light of aeromobilities based on critical realism suggests different implications as to how we should design a methodology to analyze the hub airport as an object in this system. The challenges are due to the understanding of an open system, where some of the underlying dynamics, discourses and rationalities that are driving outcomes cannot be directly observed or measured. In line with section in previous chapter related to dynamic causalities, general questions like the following need to be addressed: "*how is a hub airport made possible by social performance or organization possible?*" and "*what characteristics for a hub airport to exist?*" and "*what makes this specific hub airport possible?*

In addition to this, additional questions should be raised, such as "*How should I approach the airport as an object?*", "*How should I collect knowledge?*" and "*How should I analyze or view this knowledge in order to pinpoint some of the key driving mechanism that are trustworthy in an academic sense*?"

Using quantitative data to understand the outcomes of the system and qualitative data to understand what the drivers behind these outcomes are, I will examine several case studies. Understanding aeromobilities' production will be examined using a two-dimensional theoretical lens focusing on Policies and Materialities. The system consists of various objects interrelated due to different dynamic causalities and the design foundation of the system is based on different rationalities. The understanding rationalities or meanings will be generated by using discourse analysis in relation to interpretation of interviews and various written material, which also constitutes the empirical data for understanding the dynamic causalities. This transdisciplinary approach is appropriate to gain insight to the thoughts behind aeromobilities' approach and to grasp the complexity of aeromobilities' production.

The aviation industry consists of multiple actors in a system, each of which is influencing the production of aeromobilities in different ways. So, how should I address this system? I have chosen to make use of a case study methodology with a

focus on specific stakeholders, as it will generate contextual knowledge of the production of hub airports.

The overall frame of my research design, in order to answer my main research question (see: Introduction and Motivation) will be based on four case studies across Europe, each study focusing on the production of hub airports. The empirical data will consist of both quantitative and qualitative data, and based on a cross-analytical approach to find common characteristics across cases, I will identify drivers behind the production of hub airports. These findings will be used to generate knowledge for Copenhagen Airport and various decision-makers around the airport so they can develop Copenhagen Airport as a hub based on governance model for hub airports.

In the sections below, I will argue for this case study methodology and how to choose stakeholders to interview. Besides this, I will also address my quantitative data along with my analytical approach before elaborating on my theoretical lenses based on Policies and Materialities in the next chapter.

5.2 CASE STUDY

Based on Maaløe, I will outline the frames for how a case study is defined, including what knowledge such a study could generate. As he states, case studies are characterized as:

- empirical studies of contemporary phenomena that
- exist within the framework of the phenomena's own life and
- do not always meet an obvious, clear interface between the phenomenon and context but which
- require an investigation involving as many data sources as possible. *(Maaløe, 1996, p. 58)*[31]

This understanding will be linked to the aeromobilities approach in this thesis, where knowledge is based on the study and understanding of open systems. This is viewed as contextual, as Maaløe states, "*Case studies is the method to use, when the interface between the phenomenon and the context is not obvious*" (Maaløe, 1996, p. 78)[32]. A

[31] Own translation of Danish text:
• "Er empiriske undersøgelser af samtidige fænomener"
• "Foregår inden for rammerne af fænomenernes eget liv"
• "Møder ikke altid en indlysende klar grænseflade mellem fænomen og kontekst"
• "Kræver at undersøger inddrager så mange datakilder som muligt."
(Maaløe, 1996, p. 58]

[32] Own translation of Danish text:
"Case-studiet er den metode, man vælger, når græsefalden mellem fænomen kontekst ikke er indlysende klar" (Maaløe, 1996, p. 78].

case study approach focuses on case-specific contextual knowledge in contrast to universal and statistical generalizations that exist within conventional aviation research. This is why my selection of the case study approach is logical in relation to my meta-theoretical position.

The case study approach makes it possible to achieve holistic, in-depth and thorough analysis and interpretation of data and observations (Flyvbjerg, 1991; Flyvbjerg, 2001). This aligns with my approach to look at data through the lenses of materialities and policies. It will be possible to obtain context-dependent knowledge, which should open up to an inductive interpretation (Flyvbjerg, 1991, p. 145). Instead of a single case study, four case studies will be conducted since this will increase the possibility of identifying common characteristics across the cases.

Since my research focuses on a holistic understanding of the drivers behind the production of aeromobilities as imbedded in society, the collection of empirical data based on a field studies seems to be appropriate (I. Andersen, 2014, p. 142). As Andersen points out, the field study has its advantages when you want to understand a certain behavior in contextual settings (I. Andersen, 2014, p. 142). My field studies were conducted at five different locations across Europe. The research, which focuses on understanding the rationalities and causal dynamics within societies, can be challenging since my knowledge and fundamental understanding of local structures and historical development is limited compared to a 'local' researchers. This challenges the potential depth of my understanding of the research field, but potentially this will be counter-balanced by the intensity of my research of five different cases. Moreover, I have had the ambition to follow the same structure in each case – based on a theoretical framework I will present below – however during my investigation of my case studies, I realized that each case also have its own life and nature. Therefore, I follow the same structure at each case, but also make space for the case to develop individual.

Selection of Cases

Case selection can be based on different criteria, such as random selection or information-oriented selection, which both have different subcategories of case selection criteria. To obtain as much information and understanding of how societies handle airports, the case studies in this thesis are selected based on the criteria labeled as "extreme/deviant" as a subcategory to the information-oriented selection (Flyvbjerg, 2006) (see also: (Bloch & Lassen, 2016)). This case selection criteria is motivated by the idea that "…*the typical or average case is often not the richest in information. Atypical or extreme cases often reveal more information because they activate more actors and more basic mechanisms in the situation studied*" (Flyvbjerg, 2006, p. 229).

This strategic selection of cases increases the possibility for generalization across the case studies, and therefore a deeper understanding of strategies and policies behind hub airports (Flyvbjerg, 2001). This is line with the thoughts in critical realism, with the focus on what makes the hub airport possible based on specific context. What elements, components or discourses are present for different developments of hub airport? The studies will focus on European airports since they all operate under relatively comparable framework conditions, which increases the potential of knowledge transfer to the Danish context.

The four European airports that are the basis of my analysis in relation to Copenhagen Airport were selected based on this information-oriented selection strategy (Flyvbjerg, 2006, p. 230) and the "extreme/deviant" case criteria based on their individual characteristics (Flyvbjerg, 2006). Amsterdam and Helsinki Airports were selected because these airports have had significant developments in the number of passengers they serve. Further, Brussels Airport and Zurich Airport were selected due to the especially problematic situations they have been in because of the grounding and bankruptcy of the locally-based network carrier, which caused a temporary but significant drop in traffic. The selected airports, including the Copenhagen airport, are illustrated along with the selection criteria in Table 4 and Figure 10. Each case will be introduced and presented more thoroughly in individual chapters to come.

Case airports	**Information oriented selection with focus on 'extreme/deviante' cases** *Based on Flyvbjerg (Flyvbjerg 2006: 230)*
Amsterdam 68,5 mio passengers in 2017	One of the main hub airports in Europe
Helsinki 18,9 mio passengers in 2017	Strong development in hub activities between Europe/Asia
Brussels 24,8 mio passengers in 2017	Significant passenger drop due to bankruptcy of Sabena in 2001 After 14 years passengers level back at index 100
Zurich 29,4 mio passengers in 2017	Significant passenger drop due to grounding of Swiss in 2000 After 14 years passengers level back at index 100
Copenhagen 29,2 mio passengers in 2017	Hub activities are declining Based on Hub connectivity and relative share of transfer passengers(a)

Table 4: Case airports and selection criteria (Flyvbjerg, 2006). (a) Copenhagen Airport from 2000 to 2017, the level of transfer passengers have decreased by 35% and the relative transfer passenger share of total passengers has decreased from 47% to 20%. Hub connectivity presently indicates a decrease in hub connectivity from 2007-2017 of 30% (ACI Europe, 2017a, p. 20) – see further section 5.3. (Other sources: Official airport passenger statistics and (MIDT data) and (SRS seat data)).

Figure 10 illustrates the locations of the selected airports and their characteristics.

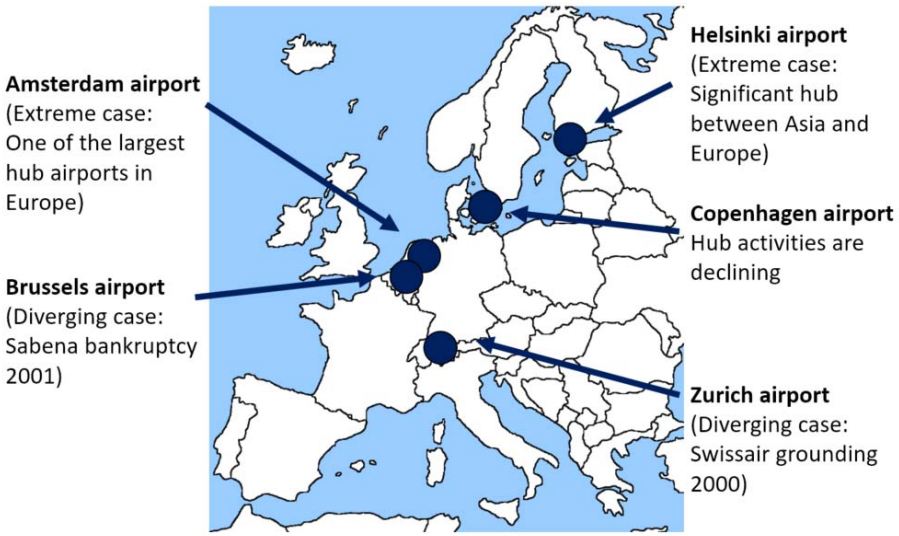

Figure 10: Locations of the four case hub airports and Copenhagen Airport and the selection criteria based on Flyvbjerg (Flyvbjerg, 2006, p. 230).

In order to be able to conduct a knowledge transfer to the Danish context, I have in line with the selected cases; also applied same method approach to the Danish case. By having the same approach, I will be able to reflect on my findings in relation to the production aeromobilities production at Copenhagen Airport.

5.3 DATA WITHIN AN OPEN SYSTEM

In order to understand the production of hub airports based on an aeromobilities approach, it is important to understand the dynamic causalities within the system, discourses and their underlying rationalities. I will focus my theoretical view within critical realism and look at my data through a set of lenses based on Policies and Materialities (see Chapter: 6 Understanding Airports Through Governance: Policies and Materialities). In line with critical realism, I will collect and generate data in order to understand the outcome of the open system and to understand its dynamic causalities and their underlying rationalities. The outcome of the open system will be based on the actual transport performance of the system, i.e., how is the connectivity of the airport or the country, where the airport is located to the world and how has this developed.

Next, I will generate knowledge related to the driving forces; in this context the dynamics' causalities and rationalities based on interviews with selected stakeholders. All along, I will study different strategy and policy documents in line with Verstehen from a critical realism position. Overall, I will base my understanding on quantitative data and qualitative data (Sayer, 2000, p. 21). Below, I present my approach to collect and generate this data. Later I will address how I will analyze the data with a focus on the qualitative dimension.

Quantitative Data

The collection of quantitative data will form the basis for an evaluation of the outcomes of the aeronautical system, however there are a number of different ways to describe and analyze traffic flows. Most commonly used are the number of passengers, seats or movements as a measure of traffic flow. These direct measurements can be used as input to conduct different connectivity measurements (Burghouwt & Redondi, 2013, p. 50).

In contrast to passenger numbers and capacities a measure of traffic flow – which I will address in the coming paragraphs – there have been developed different connectivity models to analyze and evaluate how well-connected a given airport is to other regions and the importance of the airport as a hub airport. Connectivity models generally operate with two different categories of connectivity: *Airport connectivity* and *Hub connectivity*. *Airport connectivity* or accessibility, which is an evaluation of how well-connected an airport is to the world. *Airport connectivity* is the sum of two sub-measurements: *Direct connectivity* and *Indirect connectivity*. *Hub connectivity*, or centrality, is an expression of how the airport functions as a hub or the characteristics of its centrality. There are numerous connectivity models that are all based on different methodologies and variables (Burghouwt & Redondi, 2013, p. 37).

An often-used connectivity model is the NetScan model. This model is used by ACI Europe in its *Airport Connectivity Report* published in 2014, 2015, 2016 and 2017. The NetScan model operates with a measurement for connectivity called NetScan Connectivity Units (CNU) where the model evaluate the number of weekly frequencies in order to calculate: *Airport connectivity* and *Hub connectivity*. *Airport connectivity* is a sum of *Direct connectivity* and *Indirect connectivity,* where the latter is a measure for connectivity via other hub airports to final destination. *Hub connectivity* in the NetScan model is a consequence of possible connections in the specific airport in research. This measure is based on possible connections between airlines based on airline alliances, codeshares and transfer time. The possible connections are adjusted by a quality factor, which is a consequence of a de-routing factor and a transfer factor (Burghouwt & Redondi, 2013, p. 39-40). The more central the hub airport is located between the departure airport and arrival airport – the higher quality factor (all things being equal). For example, Zurich Airport is not central located for a travel from Helsinki Airport via Zurich Airport to Oslo Airport – this

travel is possible, but the quality factor is low, due to the detour. On the other hand, a travel from Helsinki Airport to Schiphol Airport via Copenhagen Airport will have a larger quality factor, since the detour via Copenhagen Airport is less significant. It is important to stress that the quality factor also includes a transfer factor for travel via a hub; this means that a short travel via a hub, will have a lower quality compared to a travel between two long haul destinations via a hub (ACI Europe, 2014). Due to the methodology behind NetScan model there do not have to be a correlation between *Direct connectivity* and passenger development at the airport; *Direct connectivity* measure is based on number of frequencies of airlines operation at a given airport, while passenger development measure the actual level of passengers at this airport. If level of frequencies have decreased, which could be due to network optimization, the *Direct connectivity* would decrease, but if the airlines at the airport have increase their size of aircrafts and load factor, the actual level of passengers could increase. This is an example of a deviation between the two approaches to evaluate a connectivity from an airport. Connectivity data will be marked with the source: (ACI Europe, [year of the reports]).

Depending on the purpose, I will either use the connective measures put forward by ACI Europe or a simple descriptive approach based on seats and passenger flows.

There are various sources of traffic flow data. Copenhagen Airport has access to a wide range of data, however traffic flow data outside Copenhagen Airport can be obtained from commercial databases such as SRS Analyzer or MIDT Sabre. Each database has advantages and can be used to different purposes. In my elaborations on the different connectivities at the various case airports, I will make use some generic analytical presentations as shown in Appendix. C-F, these will be supplement with case-specific data from different sources such as annual reports and other reports. Below I will shortly elaborate on the two data bases – in addition to the NetScan data – used in my analysis of my case airports.

SRS Analyzer (SRS seat data) contains departing seat data. It is possible to retain data regarding how many departing seats that are supplied to the market. The data includes date and time and for the next traffic for airlines program if it is public. The data does not include information about how many passengers have actually demanded the seats offered to the market, though the seat data does provide information about which airlines have supplied the seats. SRS analyses can provide data about how many seats have flown between, for example, Oslo Airport and Paris, at what time and by what airline.

MIDT Sabre data (MIDT data) contains information about passengers and can provide data on passenger flows and will be used for analyzing transfer passenger distribution, which is not available from the SRS Analyzer. MIDT Sabre provides information e.g. regarding how many passengers are travelling to Bangkok from London via Frankfurt. The data is based on GDS (Global Distribution Systems), which contains booking

information. Not all airlines use GDS in their sale process; for example, low-cost airlines mostly use their own webpage for sales to customers and therefore, their sales data is not included in the raw MIDT data. Due to incomplete data regarding the whole market, a calibration is needed in order to reflect the actual market. In relation to SRS, the MIDT data does not include specific times or, in some cases, future bookings. Further, some airline data is based on pre-applied calibrations of the data. The database MIDT Sabre is based on data from the major GDS' such as Sabre, Amadeus and Travelport (Sabre Airline Solutions, 2014, p. 6).

See more on quantitative data in Appendix A. Connectivity data, where I have listed some of the assumptions behind the quantitative data used in this thesis

Qualitative Data: Interview

In addition to quantitative data, I will also use qualitative data to generate knowledge about the driving forces behind the production of hub airports. This knowledge will be generated based on interviews and written materials. The interviews will be conducted as face-to-face meetings with key stakeholders, supplemented by telephone or Skype interviews should the in-person interview prove to be impossible. I have chosen to conduct semi-structured interviews in order to have an open and explorative dialogue (Kvale & Brinkmann, 2015, p. 159). The interview guide is linked to the three themes: organization of aviation, politics and infrastructure, as illustrated in *Figure 11*.

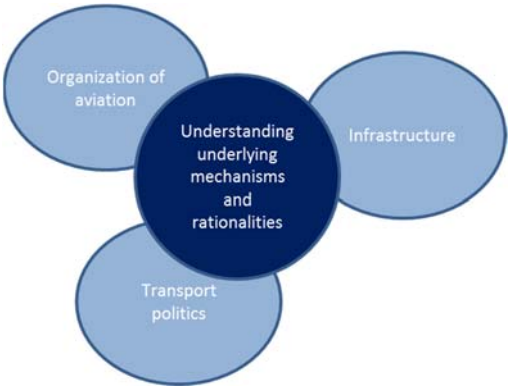

Figure 11: Framework for interview guide in order to understand underlying driving forces (See also: Bloch & Lassen, 2016)).

In using this approach, the interview is founded on themes that will generate a holistic and context-dependent understanding of the current situation. After setting up the interview guide (see: Appendix B. Interview material), the next step is to determine

the right interview participants for each case. The interview participants were selected as representatives of different stakeholder groups within the aviation system.

I decided to interview representatives from the airports in question in order to understand their perception of the driving forces within the system. The viewpoint from the airlines are pivotal and I will elaborate more on the selection of the airlines below. Additionally, I wanted to gain knowledge regarding how the public administration, the ministries or regulators of the aviation sector, understand the driving forces and setup. Due to the importance of aviation for both business and tourism, I also addressed representatives from these industries, including various business associations and tourist organizations. To supplement those viewpoints, I interviewed representatives from different unions as they are key stakeholders in the production of aeromobilities. When possible, I also attempted to set up interviews with journalists and academics who could offer an outside perspective of the aviation system, in contrast to the other interview participants that represent a given stakeholder.

During 2016, I visited each case airport's country for four to five days, conducting more than 25 interviews in all, each lasting between 1 hour and 2.5 hours. Due to interest and availability of the interview participants, the number of interviews varied from 4 to 9 interviews per case. During 2017, more interviews were completed via conference calls since it was not possible to set up in-person meetings while visiting the given case airports. During the fall of 2017, I interviewed key stakeholders in Danish aviation in order to collect data. As depicted in Table 2 below, I conducted 35 interviews in total.

	Finland	Zurich	Amsterdam	Brussels	Copenhagen
	Apr ´16	May '16	Sept ´16	Oct '16	Oct/Nov/Dec '17
Airports	√	√	√	√	√
Airlines	√	√	√	√	√
Transport ministries/CAA	√	√	√	√	√
Tourism organizations	√		√		
Business Confiderations	√	√	√		√
Unions	√	√	√	√	√
Academics		√	√	√	
Journalists				√	
Total interviews (persons)	**7 (8)**	**6 (6)**	**9 (10)**	**7 (7)**	**6 (7)**
			+ Workshop with AMS		

Table 5: Illustration of the different actors I interviewed in case studies across Europe from 2016 to 2017.

Methodologies of sampling people for interviews can always be argued. Considerations such as who or what they represent and their level of experience within aviation have been elements in my selection process. Within each segment of interview groups, there can be diverging positions. This may occur in relationship to airlines that have different stances due to their business models; for example, low-cost airlines and network airlines have different views on policies and infrastructures. In

addition to these considerations, a key criteria has been to conduct interviews with subjects who have significant insights and knowledge. This is, of course, difficult to evaluate, but when evaluating my interview subjects, elements such as long carrers within the aviation industry or members of top management levels were important for my evaluation since they often have significant insights regarding crucial elements that impact the development of aviation in their region.

I chose to focus my research on the viewpoints of former national carriers, which are also the largest airlines within my selected case studies. This selection can be viewed as critical because the liberalization of the aviation sector in Europe has allowed low-cost airlines to have very significant growth and they are now key in terms of the production of aeromobilities across Europe. The deselection of these stakeholders took place in light of the overall focus on hub airports in this project. Argumentation against this deselection could be made as there is no longer a clear-cut difference between the two business models since both national and low-cost airlines are adopting elements from each other (see: Chapter 2.2 Development Within the European Aviation Market).

Regardless of this consideration, the final selections were also based on a matter of resources. One stakeholder group I did not interview due to resource constraints is the air navigation service providers (ANSPs), such as Naviair in Denmark or Belgocontrol in Belgium. These stakeholders are part of the production of aeromobilities, especially in these years where the airspace across Europe is highly congested and inefficiently managed (European Commission, 2015, p. 6), disregard of this deselection of these, Belgocontrol addressed in Brussels case, since the company is an element in distribution of externalities. Further, I have chosen not to interview local inhabitants living near the airport. This could be interesting especially due to the framework presented by Kesselring in Chapter 3 Aeromobilities, where the aviation system is illustrated as a contradictory positions between air transport actors, local governments and inhabitants. Despite this perspective, the direct involvement of inhabitants have been deselected due to the scope of this thesis.

It can sometimes be a challenging task to have the right entry to interview persons, both in relation to which organizations to interview and which people within these organizations to address. The professionals I interviewed were found through recommendations from other professionals, my own network and academia.

Without recommendations or direct access to any organization, it would have been difficult to gain access. Some organizations I tried to contact directly, and within each one I tried to contact the highest-ranking relevant persons directly. Many times, they did actually accept an interview, but other times they redirected me to subordinate colleagues. These professionals often had extensive knowledge within aviation, and therefore such interviews were rich and cost-effective elements in the data collection process (Beamer, 2002, p. 95). It is important to be aware of the fact that the interview participants are being interviewed because of their profession, and this perspective

can sometimes cause challenges due to a possibly biased promotion of a given corporate point of view (Kvale & Brinkmann, 2015, p. 202). Disregard of these considerations; the interview with influential professional provide have an "*insight in the mindset of the actor/s who have played a role in shaping the society in which we live*" (Richards, 1996, p. 200).

In terms of transcription, I transcribed the interviews from the Helsinki case myself; thereafter I had a professional or student complete the transcription process. In order to secure the quality of these transcriptions, I listened to the interview while reading the transcript. After the transcription process, the analytical process of the interviews and strategic documents commenced.

Qualitative Data: Strategic Papers and Policy Papers
In addition to the generation of qualitative data based on interviews, I also collected and analyzed different written materials. This material varies from case to case, but consists of different strategic papers, policy papers, reports and official documents, including aviation policies, transport policies or foreign trading policies; academic articles, newspapers, and books. In order to locate this material, I used desk research, along with dialogue with the interview participants about important documents or reports.

One challenge within document analysis is the language of the documents. Some of the key documents are in English, but often the supplemental documents are written in the local language, such as Dutch, German or Finnish. In some cases, the main document was written in the local language and a shorter abstract in English was available. I used Google Translate to convert these documents both to English and to Danish in order to have a dual translation that could help me verify the translation's accuracy. I was aware of this challenge, and if there was a part of a text about which I was uncertain, I used native speaking persons to assist me in the translation. The language challenge also applies to my search and understanding of academic articles. Here I have mostly searched for articles written in English and this has, of course, limited my search.

5.4 ANALYTICAL PROCESS

After collecting the data, I began the analysis process. This has not been a straight-line process due to the timespan of my research. For example, I conducted most of the analysis in relation to the Helsinki case shortly after collecting the data. However, due to the nature of such process, insight in one case led to revision of some of the data and analytical processes in other cases. Further, the theoretical framework has developed throughout the project, and therefore data had to be revisited several times.

I have chosen to look at my data through a two-dimensional lens that consists of Policies and Materialities. In the next theoretical chapter, I will elaborate on how I understand Policies and Materialities and how I have distinguished between them. Before this, I will address my analytical process in order to generate knowledge based on the collected data.

As stated in the in the Chapter: 4 Theory of Science, I based my analysis on my collected data in order to understand the driving forces behind the making of hub airports. As stated previously, the analytical process includes two dimensions: first an understanding of dynamic causalities with in the open systems that makes hub airports and then identify discourses along the verstehen or rationalities associated with this.

I will in this section also present discourse analysis as a method to analyze and understand the underlying rationalities or meanings, and my approach to identify the dynamic causalities behind the aeronautical system with a focus on the hub airport.

5.4.1 DISCOURSE ANALYSIS

In order to analyze my collected data, a discourse analysis seems appropriate as an analytical approach that enables me to gain an understanding of different discourses associated with aviation. The discourse analysis in this thesis is an analytical tool to understand the rationalities behind different policies and strategies related to hub airports. The understanding of the discourse analysis used in this thesis is not part of my meta-theoretical considerations, even though it could be included in these. In my analytical process of identifying discourses, I have based the approach on Jensen (2005), who works with three dimensions in the analytical process: power-rationality, articulations and practices (Jensen, 1999, p. 55) found in (Jensen, 2005, p. 180). However, this thesis is not a traditional power analysis, but the analysis will mainly focus on articulations and practices to identify discourses, which will enable me to understand the rationality or meanings in relation to hub-airports as parts of society.

The data for my discourse analysis includes my conducted interviews and different documents related to aviation. Articulations are understood as how the interview participant articulates different phenomenon (J. Andersen, 1992, p. 66). In this case of aviation, for example, this may include his or her point of view on how aviation is perceived within society. It is important to stress that these viewpoints can sometimes be seen as representations of the interests from stakeholder groups. See: 5.3 Data Within an Open System – section: Qualitative Data: Interview.

Further, by reading the collected materials, I was able to understand the different articulations about how aviation practices are understood and how aviation is organized or handled within society, which could relate to how some of the externalities are addressed within aviation. The practices does not necessarily need to

be practices focusing *directly* on aviation, as it could also be practices that are related to aviation, such as how the development of other types of infrastructure is addressed. These practices indicate how major changes and the cost of them is addressed within society. Understanding these practices is relevant to aviation since it could indicate the willingness of stakeholders to bear some of the cost of aviation. There is a strong link between articulations and practice, and often practice is a consequence of given articulations (J. Andersen, 1992, p. 66).

It is important to be aware that the discourse analysis is not a straight-line process; rather, it is explorative and iterative, purposefully, as a way to identify different patterns that can build up arguments based on similarities or differences. As Taylor explains, "*[the] analysis involves reading and re-reading an entire dataset, comparing, noticing and marking points of possible interest and returning to them later*" (Taylor, 2013, p. 69).

These discourses and meanings or rationalities are interpreted by the different articulations and practices I have unfolded by analyzing the data. There can be different rationalities, and throughout my analysis, I have attempted to gain an understanding of whether one of these has won hegemony.

The discourse sometimes has a historical dimension. An example of this is the meaning or rationality associated with the open markets in Europe and the freedom of movement for workers in Europe. This rationality is linked to a belief that interaction and dependency across Europe could prevent future wars in Europe, which is a lesson learned after WWII. Therefore, genealogy is an important aspect in understanding the meaning of different systems, and in my thesis the aviation system. Consequently, I have supplemented my analysis with historical documents in order to see whether the rationalities have changed over time due to different historical contexts (J. Andersen, 1992, p. 67-68).

The question for this thesis is how does the making of a hub airport take place? I will argue that a discourse analysis is appropriate since it will generate a deeper holistic and context-dependent understanding of the different thoughts and rationalities supporting and developing aviation in each case since the discourse analysis will have the purpose to uncover the social phenomena of an airport in the context of a society (Taylor, 2003, p. 27).

5.4.2 DYNAMIC CAUSALITIES

Along with discourse analysis, I have also used the collected data to generate an understanding of the dynamic causalities that exist between the different objects within the systems. This understanding is based on my interpretation of the conducted interviews and my assessment of different statements presented in the written

materials I have reviewed. As a result of this process, I am able to understand what different dynamics consist of. One example of a dynamic causality is that, due to the neighbor relationship between Finland and Russia, Finish aviation has some advantages in relation to other airlines in terms of traffic rights. In this particular case, there are two objects: Finnish aviation and Russia; and the advantages are due to the historical relationship between the two countries.

The overall analytical process of my four case airports and Copenhagen Airport is to understand the dynamic causalities between different objects within the open system and in order to understand the underlying discourse and rationalities. Based on this framework and analysis, I will also highlight elements within the system that can be used to develop my model of understanding hub airport governance.

Hereafter, I will conduct a cross-analysis in order to find patterns, similarities or other understanding about what the driving forces are across these cases

The last analytical process is to compare my findings with the situation in and around Copenhagen Airport, and then conduct a knowledge transfer to Copenhagen Airport and regional and national decision-makers in order to maintain the development of Copenhagen airport as a hub. The goal is not to develop a unique approach of handling aviation in the best way, but to learn from the different cases studied and their contextual setup to provide a range of suggestions and findings that facilitates Danish aeromobilities.

5.5 EPILOGUE

The methodical approach to understand hub airports in this thesis in the light of aeromobilities and critical realism suggest different implications of which methods to apply in an open system. In order to gain knowledge and understanding of the systems, a case study approach is appropriate. Therefore, I have chosen to conduct four international case studies of hub airports across Europe based on "*extreme/deviant*" case criteria, the case airports are: Schiphol, Helsinki, Brussels and Zurich. In addition, I will analyze Copenhagen Airport in order to understand the current situation.

The collection of data consists of both quantitative and qualitative data, where the latter part is interviews and different strategy and policy papers. In all I have conducted 35 interviews involving 38 interview persons and in addition one workshop in Schiphol Airport. The quantitative part of the data collection for understanding the connectivity of the aviation system is based on databases with departing seat capacities and transfer flows. In addition, I have used data sources from Copenhagen Airport along Connectivities reports from ACI Europe.

The analytical process consists of several elements; first, I will analyze the open system to understand the dynamic causalities between the different objects that I will uncover through by collection of data. Second, I will based on a discourse analysis with a focus on articulations and practices identify the underlying discourses that are associated with the aviation system. This analytical approach allows me to understand rationality and meaning to support and develop the aviation system and here in particular the development of hub airports. Finally, based on the analysis for each case I will identify learnings that can enable me to develop a model of understanding hub airport governance.

6 UNDERSTANDING AIRPORTS THROUGH GOVERNANCE: POLICIES AND MATERIALITIES

"The importance of the polity-level institutional framework to aeropolitics cannot be overstated. While economic institutions have a direct impact on the development of aeropolitics, political institutions set the boundaries within which economic institutions operate." (J. J. Wang & Heinonen, 2015, p. 182)

"The differences among the places that provide the infrastructure enabling these processes to occur mean that globalization is constructed differently in each place, from an external force that has to be granted access, to a series of processes that need to be engaged with to keep growth occurring here and not somewhere else." (Cidell, 2006, p. 661)

6.1 PROLOGUE

The role of a hub airport has changed in the last decades, predominantly due to the liberalization of the aviation industry, which has caused the airlines to be more *footloose* (see Chapter 2 What is a Hub Airport?) in terms of where they open and close new destinations. Additionally, some airports have gained more operational freedom due to different kinds of private or semi-private ownerships models (see section: 2.2 Development Within the European Aviation Market). This has increased the airports' possibilities and focus in generating connectivity, and has transitioned airports from being passive infrastructure providers to now having a more active role in facilitating increased connectivity. Historically, conventional aviation research has had a tendency to primarily focus on airports based on positivistic paradigm and with research agendas such as optimization of airport functions and with a limited focus on the link between airports and society (See section: 2.4 Field of Aviation and Airport Research and Chapter 3 Aeromobilities). The new mobilities paradigm and the development of aeromobilities have a broader societal foundation, where some of the conventional perspectives are challenged and new research agendas are developed. Even though aeromobilities have a wider societal perspective, the investigation of how airports are governed as an active part of society is less developed.

Therefore, this chapter will theoretically introduce governance in broader terms, apply it in relation to airports and suggest a specific model for airport governance based Policies and Materialities as a foundation for further analysis.

Few other research projects, mainly within conventional aviation research have researched on airport governance, however this – as I will address later in this chapter – mostly had a focus on different forms for financial regulation of airports. Instead of a strict financial regulations of airports, that has the purpose to adjust potential market failure, I will in this chapter argue for a governance model, that could bridge airports and the state for generating a platform where different viewpoints can interact and be coordinated in order to common understanding of direction for further development of aviation. This is a way to open up the aeromobilities research agenda to expand the perspective from a micro- to a meso- or a macro-perspective by researching the societal meanings and implications of hub airports.

In line with the thoughts from critical realism, the outcome of a system depends upon dynamic causalities between the different objects within the system, and these are associated discourses and a meaning or a rationality. The data collected may be viewed in a variety of ways. For example, the data could be viewed through the lens of regulation or economic transaction or geography. However, I have in this thesis chosen to look at the hub airport through the notion of airport governance, and with this perspective argue that the production of hub airports takes place in a nexus of Policies and Materialities.

In the section to come I will elaborate on the theory and concepts of governance.

6.2 GOVERNANCE

Over the last decades, there has been a general trend in Western democratic politics that has moved from a governmental approach to a governance approach. In other words, the democracies have had an *explosion* and *implosion* of politics. The process towards governance politics is linked to a process where politics are been redistributed from a traditional political institutions (explosion) to other political institutions, corporations or semi-private institutions (implosion) (Jensen & Richardson, 2004, p. 30). I will elaborate on the trend in sections below where I will also differentiate the implications of this trend.

My understanding of the governance setup is in line with Jessop, who suggested that governance is a way to organize groups or individuals from different societal areas and levels through dialogue, negotiation and cooperation in order for them to coordinate common decisions (Jessop, 2000, p. 11). This is one way a state can counter the interests of politics and the economic interests. The purpose of this setup is to secure a framework for market actors and the societal interests in a time when

top-down coordination by the state is less in focus and where there is an increasing focus on public-private partnership, network and other forms of self-organization and self-regulation (Jessop, 2000, p. 18).

6.2.1 DEVELOPING OF GOVERNANCE STRUCTURES

The governance approach is developed in the scope of the change of western societies from a welfare or national state based on Keynesianism, to a workfare state or competition state as post nationalistic regime based on the thoughts from Schumpeter, Cerny or Hirsh (Jessop, 2000, p. 29). Jessop argues that this change is due to three trends: denationalization, decentralization and internationalization. *Denationalization of the state* has resulted in an increasingly decentralization of political functions to international institutions such as the EU, but also down to regional and local levels. Consequently, the national political level has lost strength in relation to its ability to exercise influence within national borders and internationally. Some cities, regions and supranational functions have gained more influence in addressing some previously state-controlled functions. (Jessop, 2000, p. 40,54). The *decentralization of governmental regimes*[33] has occurred in states that are redistributing and reorganizing state functions to different partnership models between public and private actors.

This imposes a shift from a top-down governmental approach to a larger degree of self-governing, interorganizational relations; even though public spending still is involved, private resources are now also included in this organizational setup (Jessop, 2000, p. 41,54). The *internationalization of policy regimes* are related to the increasingly international influence on national politics. This implies an increasing focus on international politics in contrast to national political. (Jessop, 2000, p. 44,54). These trends towards governance politics are associated with challenges of transparency and identification of decision process, and thereby democratic control of the decision-making process (Jensen & Richardson, 2004, p. 30).

Jessop argues additionally that these changes have generated a transformation of four aspects of a state's function (Jessop, 2000, p. 18):

The economic function: refers to the states' interest in generating a foundation for private companies to generate profit. This is an important function since the market cannot solely generate the right conditions; it has to be supplemented by non-market conditions (Jessop, 2000, p. 19).

The social function: relates to the states' special function in the reproduction of labor. This is an essential foundation for the economic function, both in terms of education and social benefits, since this reliance on labor force that for most cases is produced

[33] Own translation of: "*Afstatsliggørelse"* (Jessop, 2000, p. 37].

and reproduced outside the market, requires coordination between the social and the economic function (Jessop, 2000, p. 19).

Organizational levels: refers to the concerns that the political level is, among other aspects, formulating the social and economic policies. One example is a region or local municipality handling functions the national state previously considered its responsibility (Jessop, 2000, p. 19).

The preferred coordination between economic, political and social areas: enhances the economic and social frameworks in order for these to fulfill their functions. For example, the state provides infrastructure, something the market might not necessarily do on its own. If there is a market failure, the coordination mechanisms imposed by the state are just one of several that can come into play for a rebalance of the failure (Jessop, 2000, p. 19).

As a consequence of the trends and the changes in aspects of state functions, a shift from a top-down approach to a larger degree of involvement from private and semi-private organizations and corporations has occurred. Therefore, it is important for the state to enforce some kind of governing structure to secure the reproduction of economic and social conditions for the market in order for it generate capital.

6.2.2 GOVERNANCE – A BRIDGE BETWEEN MARKET AND STATE

Due to the shift from traditional political institutions to other political institutions, corporations or semi-private institutions; there is a need bridging the state and different stakeholders. It is on this basic governance that has an important role within societies, since the governing models are able to set-up a coordination mechanism between the different stakeholders (Jessop, 2000, p. 18).

The globalization and denationalization of political systems have caused a paradoxical development. On one side, state leaders have supported structures that have redistributed power upward, sideways and downward; on the other side, political leaders are trying to regain leverage in order to be able to improve their political operational strategic autonomy (Jessop, 2000, p. 124). In light of this shift from a top-down political approach to a more decentralized decision-making approach, the ability to coordinate the different stakeholders within and outside the state is key to governing the framework conditions. It is in this sphere that the governance approach has its foundation, as an alternative to both the organization of the market and the system of hierarchy (Jessop, 2000, p. 124).

Another aspect supporting a governance approach is the idea of bridging the state and the market in order to avoid the risk of relying too much on either side and risking a potential failure. A market failure occurs when the market does not operate in line

with the concept of a perfect market, and state failure to operate in an efficient way can be associated with such a situation[34] (Jessop, 2000, p. 157-159). There are different thoughts on how to react to such failure; some would argue for an expansion of the market, while others would argue for more state interventions (Jessop, 2000, p. 158-160). The governance approach is to not take part in debate conflict between the market and the state, but instead the approach emphasizes bridging these two sides though common projects (Jessop, 2000, p. 160).

6.2.3 GOVERNANCE IS FOUNDED WITHIN COMPLEXITY

Before I will elaborate on the different aspects of governance, it is worth noting that Jessop argues for open systems that possess unlimited, unstructured complexity. Therefore, it becomes a question of how to address this challenging situation in order to understand it. Jessop argues that by adopting a governance approach, it will be possible to structure the unstructured complexity, even though it never will be possible to control all the effects of such a simplicity (Jessop, 2000, p. 128). One way to address the complexity is to generate some kind of structure within the complexity. Jessop argues for a distinction of complexity between *interpersonal relations*, *inter-organizational relations* and *inter-systematic relations* (Jessop, 2000, p. 125).

The different systems and relations are interlinked, and each has specific characteristics that are different from the mechanism within the hierarchy and the market. In addition, there are challenges within each of them related to decisions and potential solutions. Below I will address the different proposed relations and levels in order to structure the unlimited complexity.

Interpersonal relations is one dimension of the complexity. These relations are associated with a challenge of trust between the involved stakeholders due to different expectations and behavior among them. A consequence of this lack of trust is the challenge that arises when it comes to aligning different individual organizations, especially if the organizations have a large degree of autonomy. One way to construct systems to overcome this challenge is by formalizing and focusing on personal networks between the involved stakeholders (Jessop, 2000, p. 131).

The *inter-organizational relations* can benefit a governance approach by increasing the ability for stakeholders to innovate and learn from one another in an increasingly dynamic society (Jessop, 2000, p. 132). In the case where organizations possess key resources, it is important to coordinate between the organizations if a common result is necessary for the benefit for all parties. This coordination can be achieved by negotiation and establishment of short-term common goals, to the benefit of the

[34] There are several academic schools debating different kinds of market and state failure and potential solutions to these. I will not address these debates here, due to scope of this thesis, but just briefly mention the two aspects.

involved parties. One of the cornerstones for success in governance is the development of inter-organizational competencies that will generate synergies among individuals involved in different organizations (Jessop, 2000, p. 132).

Within the *inter-systematic relation*, the governance approach can become increasingly challenging if there are different societal objects within each system that are involved. Here it is important to reduce noise in the communication and promote mutual understanding. Further, it is important to address and be aware of *negative coordination,* which can result in negative effects for one stakeholder because of the actions of others. Instead, there should be a focus on positive coordination focused on harmonized strategic actions towards a common goal (Jessop, 2000, p. 133).

These governance levels relate to different hierarchical positions where some are subordinate to others, but they all provide a clarification of the interdependency of each other that helps and supports the governance of the complexity. The acceptance of the different hierarchies also enables increased negotiation at the inter-organizational level, which in turn increases the general trust within the governance system as there is less opportunistic behavior among the stakeholders involved (Jessop, 2000, p. 133).

6.2.4 STRUCTURE OF GOVERNANCE

Due to changes in societal structure with a previously dominant top-down governmental approach, and in order to bridge the market and the hierarchy to counteract the potential failure within these two, there has been a tendency to focus on governance structures. There are no guarantees that such an approach will succeed in countering these potential challenges, but by focusing on both the interest of the state and the market and by sharing power, the governance structure can be beneficial for the state in achieving political goals and for the market in formulating the focus for the governance approach (Jessop, 2000, p. 163).

Jessop argues that an effective setup of governance system is based on the following characteristics (Jessop, 2000, p. 129).

- *Simplified models and practices* enabling a reduction in complexity, but still in line with the focus of the given stakeholders involved.
- A *knowledge of the causal processes and their relatedness,* including *assignment of responsibility and competencies* to act and coordinate.
- *A framework of methods* to align actions across different stakeholders.
- *Establishing a common worldview among stakeholders* and a system that can settle key stakeholders' focus areas, expectations and behavioral approaches.

The characteristics above constitutes the basic governance model of understanding for my further research, and based on this framework, I will via empirical findings from my case studies and analyze, develop my proposed governance model for hub airports.

A successful governance structure has to be founded on a common worldview or rationality that all relevant stakeholders can agree upon; this includes an alignment of expectations and processes of objectives that will be part of relevant progress towards solutions (Jessop, 2000, p. 136).

A governance model is not a guarantee for success in relation to state or market failure. There are no predefined measurements for optimization or realization of political goals. These can be established, but the primary focus needs to be on whether or not the governance models are able, if needed, to redefine objectives through negotiations and reflection among the involved stakeholders within the common worldview (Jessop, 2000, p. 163).

In contrast to state and market failure, which in theory can be monitored, the challenge of failure within a governance approach can be difficult to assess. Jessop highlights three sources that can challenge this dynamic. First, the embedded conflict between interests of the state and the market organizations; the governance model forces these two to have a coordination which could cause an increase in conflicts. The second challenge is determining how state functions that are not directly involved with the governance setup respond and support the governance model outside their functionality. This conflict between different state functions can materialize in a lack of different kinds of needed support. This conflict may be rooted in different agendas or be due to different time line. Lastly, there is a challenge if the conditions for the objectives are presented too simplistically or if there is too little knowledge about the causalities that can influence the objectives for the governance model. This challenge is likely to occur if the objective is unstructured and part of a complex global system (Jessop, 2000, p. 165).

In order to prevent some these potential governance set-up failures, Jessop suggests organizing a governing body with representation that establishes an overall governance structure – or metagovernance structure. It is not a control function, but the body sets the direction for the roles and functions within the governance structure. Further, it establishes the economic foundation for the structure and identifies the key participants. In order for the governance structure to work properly, the body also needs to establish an appropriate and agreed upon feedback mechanism, and be ready to act as an appeal court in the case of discussions within the governance structure. Beside these structural settings, the metagovernance body establishes the basic governance rules, ensures the different stakeholders' agendas are compatible, develops unified expectations and evaluates and adjusts the power balance between the stakeholders as necessary. Lastly, the metagovernance body also takes the political responsibility in case of governance failure (Jessop, 2000, pp. 141, 165-166).

It is based on this overview of development within society's structures and the development of governance approaches that I have developed my analytical approach to understanding the production of aeromobilities. In the next section, I will elaborate how this agenda should be used to understand the production of aeromobilities.

6.3 AIRPORT GOVERNANCE

The theory about governance presented above relates to a broad approach on how to bridge the gap between state and market in order to reach common objectives. In this section, I will elaborate on how the governance approach can be adopted to the aviation sector, with a special focus on airports.

As stated above, the governance approach is a way to bridge the market and the state in order to settle decisions in progressing toward a common goal. That approach is a sound one for bridging the market, here represented by airports and other aviation relevant stakeholders, and the state. As mentioned previously, significant part of European airports are predominantly private, semi-private or corporatized entities[35] and they are operating in a competitive environment (Thelle & Sonne, 2018, p. 9). Due to their ownership structure, airports have a tendency to behave as profit-maximization entities and consequently pursue revenue and cost optimization. This may impose different externalities, such as short-term optimization or less concern regarding an airport's environmental and social impact (See section: 2.2). These tendencies can be in opposition to the interest of states, and therefore it can be logical consequence to have different forms of airport regulation - including spatial and economic regulation.

The societal importance of airports from an economic perspective has been determined as relatively important due to the impact on GDP, income and job generation. Therefore, airports are also important from a national strategic point of view as they provide a facilitation of connectivity, especially after the liberalization of airlines, where airports to a higher degree are an active part in the production of aeromobilities.

[35] The process of different forms of privatization of airports as addressed in section 2.2 Development Within the European Aviation Market can be linked to the trend where politics have moved from a governmental approach to a governance approach.

In broader terms, airports can be understood as interfaces to the global space at the back of externalities. Therefore, airports need to be understood in a wider perspective than just as stand-alone entities. Kesselring articulates the importance of this wider perspective when he states:

> *"…airports are interfaces with global space; they stabilize the cosmopolitan mobility potential of the mobile risk society by providing the logistic infrastructure for acceleration and global coordination of organizational processes in business and society. But, on the other hand, airports are territorial and thus bound by social, economic and political norms of their location. They cannot develop independently – hence, the importance of the neighboring local level."* (Kesselring, 2009, 48-49)

Consequently, states should be interested the production of aeromobilities, not only by focusing on financial regulation or adjusting for externalities, but also in the development of connectivities.

The local, regional or national authorities can have different approaches to their support and involvement in the production of aviation. This include their involvement in airport capacity or providing landside capacity such as railroads or roadways and how these entities relates to different form of externalities. On a global plan, governments have the opportunity to be involved in traffic rights via bilateral negation with other states and affecting international institutions such as ICAO or EU. All of these elements are examples of how society and the government is involved with the production of aeromobilities.

6.3.1 AIRPORT GOVERNANCE LITERATURE OVERVIEW

As suggested, governance is one way to bridge the interests of market and state. Interestingly, governance of airports has had very little academic attention. In line with the literature overview conducted in Chapter 2.3Conventional Aviation Research, I did a search for "*Governance*" within the *Journal of Airport Management*. The search returned 89 articles and after an evaluation of titles and abstracts, I located only four relevant articles concerning research on airport governance. In respect to the more than 1.200 researched articles in the *Journal of Air Transport Management*, the governance perspective of airports does not have significant attention from researchers. There is significant literature related to the financial regulations and externalities, but research focused on non-financial aspects of the relation between state and airports is quite limited.

Below I will shortly address some of the key considerations, and results presented in the articles on the relation between state and airports. The overview of the articles

give examples how different motives and discourse between the market and the aviation stakeholders including airports can influence the development of aviation.

*"*Aeropolitics in East Asia: An institutional approach to air transport liberalization"**.** This article focuses on the development of aeropolitics and, using a mixed-methods approach, the researchers evaluate three Asian cases with a focus on how institutional organizations and economics as well as territorial and demographic size influence air transport in the region. The researchers find that the direct effects from the latter three variables are limited, while the political approach to the development of aviation is important. The article highlights the economic regime aviation is facing has the largest impact on its development. However, it is important to stress that this framing is influenced by the political institutions (J. J. Wang & Heinonen, 2015).

*"*Airport ownership and regulation in Spain: Explaining the resistance to change*"*. This article focuses on Spanish airports and analyze the sale process of these in 2015. Only 49% of the shares were sold, and therefore the airports remains within the control of the public. The empirical analysis relies on 40 in-depth interviews with politicians and economic leaders and reveals that even though the public ownership of airports can be perceived as outmoded, the airports were not sold due to political interest in avoiding higher degree of decentralization in Spain. This paper illustrates that the functions of airports, here related to potential decentralized focus due to privatization, and therefore the development of aviation can be influenced by local and national political interests (Ballart & Güell, 2015).

"Aviation planning policy in Australia: Identifying frames of reference to support public decision making". This article focuses on airport expansions in Australia and the discourse among the state and local governments that are part of the approval process. The research is based on a Q-methodology case study of eight privatized airports. Among the stakeholders, the researchers found that there were two dominant discourses: one related to *power struggle* and one related to *functional use.* The researchers do not propose a solution to the expansion issues, but highlight that having insights about the prevailing discourse among stakeholders can support the effort in reaching results. This article illustrates that the process of developing airports is less problematic if participants are aware of the different discourses among the involved parties (Kivits & Charles, 2015).

"Challenges in land use planning around Australian airports"**.** This article focuses on the challenge to develop landside infrastructure supporting airports in Australia. The conflict lies between the airport business itself and the local business environment as a whole, and the local and state governments. The conflict is, to some extent, linked to the different discourses between the two sides. The airport business sees their airport planning as effective, however the off-airport infrastructure needs to be improved by partial government funding. The other side of the conflict perceives the airport planning as inadequate and even though they accept the need for improved off-

airport infrastructure, there is a concern related to increased airport activities and the associated externalities as being to the disadvantage of local citizens and businesses. This article illustrates that even though both sides acknowledge the need for improved landside infrastructure, there can be resistance in the pace due to conflicting discourse and visions (Freestone & Baker, 2010).

The overview of articles exemplifies that discourse influences the development of aviation, including the frame under which airports are operating within society. This motivates a need to understand the discourse prevailing among stakeholders in order to develop aviation. As I have presented above, a governance structure could be a platform where viewpoints can be synthesized to develop aviation. While the platform does not need to necessarily have the presented structural form, a structure that creates a forum where the different discourses can intertwine is preferable. It is on this basis, I approach my cases in order to understand the discourses that have won hegemony and that have laid the foundation for the aviation policies together with given materialities.

As stated previously, in order to understand the driving forces of hub airports, I will argue that my model for understanding airport governance will be based on different Policies and Materialities. Based on an aeromobilities thinking, the hub airport cannot be considered as a stand-alone business, but as an active entity embedded in society.

Therefore, I have chosen to understand the governance of airports by analyzing the dynamic causalities between policies and materialites to identify learnings to develop the airport governance model based on the thoughts from Jessop (see section: 6.2.4 Structure of Governance).

Below I will briefly elaborate on these lenses. It can be discussed how to separate different dimensions into such a clear groupings, but for analytical reasons I have chosen the following demarcations.

6.4 POLICIES

I do not reject the conventional approach to understanding the driving forces behind hub airports, such as the correlation between GDP or catchment area and connectivities; but I still argue that there is more than this understanding. As mentioned previously, Burghouwt and Dobruszkes address that most of the conventional approaches to understanding aviation rely on quantitative data and focus on the establishment of laws and regulations while disregarding the outliers in analysis (Burghouwt & Dobruszkes, 2014). Burghouwt and Dobruszkes argue that these outliers can be due to local factors, such as strategies by public and private actors within the aviation sector. I argue that it is not only local politics that influence these developments, but also politics on higher strata.

Aviation strategies towards airports and aviation are often expressed in specific strategies from different stakeholders. The airport strategies do not necessarily be public available information, but parts can be prevailed in annual reports or by interview with relevant airport employees. Further, there may be aviation strategies formulated by be different regional or state departments.

The national aviation strategies are not necessarily produced with the same frequency as annual reports. National strategies regarding aviation are published in official papers in Finland: *Finland's Air Transport Strategy 2015-2030*[36] and in The Netherlands: *White paper on Dutch Aviation*[37] or *Schiphol Action Programme*[38]. The strategies regarding aviation tend to be produced years apart, as is the case in Denmark with the Traffic Ministry's publication of aviation strategy in 2005: *Danish Aviation 2015 – possibilities and challenges*[39], *Report from Danish Aviation Committee*[40] in 2012 and the newest aviation strategy in 2017 published by the Danish Governement: *Aviation strategy for Denmark*[41].

In addition to these strategies, which can have different scopes in relation to aviation, there are other areas that are also important to address in order to understand the how aviation is produced. Due to the wide scope of aviation, there are links to general transport policies, as well as foreign and domestic policies, including externalities. Consequently, it is important to be aware of these when understanding the drivers behind the production of aeromobilities and development of hub airports.

In line with this, I will consider different stratifications of potential aviation strategies or politics that includes aviation elements throughout my analysis:

- **Airport strategies**: This relates to how the airport positions itself strategically in relation to competitors, different parts of the aviation system and externalities. These strategies expose how the airport positions itself in society with all its components.
- **Regional aviation politics:** These policies can have different scopes, including metropolitan strategies, where aviation is address in relation to development of the city, or focus on the spatial development of aviation

[36] (Ministry of Transport and Communication, 2015b).
[37] (Ministry of Transport, Public Works and Watermanagement and Ministry of Housing, Spatial Planning and the Environment, 2009).
[38] (Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, 2016).
[39] Own translation of: *Dansk Luftfart 2015 - muligheder og udfordringer* (Transport- og Energiministeriet, 2005).
[40] Own translation of: *Redegørelse fra udvalget om Dansk Luftfart* (Udvalget om Dansk Luftfart, 2012)
[41] Own translation of: *Luftfarts strategi for Danmark* (Transport- Bygnings- og Boligministeriet, Udenrigsministeriet, Finansministeriet, & Erhvervsministeriet, 2017).

capacity, such as airside or landside infrastructure, including ground transport.

- **National aviation politics**: This relates to policy papers on how the state addresses aviation. Some examples are given above, and these focus on different aspects and articulation of how aviation within a given state should unfold under a particular set of circumstances. Along with these national aviation policies, air traffic rights settlements could also be considers as political.
- **Other national politics:** Policies such as transport policies, foreign policies and domestic policies relate to different aspects that influence aviation directly or indirectly. This could include foreign policies that involves aviation elements such as providing new markets for developing connectivity. In addition, national constitutions or federal policies are also politics to consider when looking to understand the driving forces behind aviation.
- **Global aviation politics:** This relates to the different international guidelines and regulations that are suggested by ICAO or other international organizations and are established and proposed in order for air flights to perform regularly and risk-free in the global order (Urry, 2009, p. 30).

Not all these policies are available in all of my cases, but I have included those who are relevant or present. In order to have an overarching articulation of politics and strategies I will use the term: Policies to encapsulated both terms.

6.5 MATERIALITIES

After I have addressed different kinds of policies as one dimension in the making of hub airport based on an aeromobilities thinking, I will address the other dimension: Materialities, as supplemental to the political dimension. I have chosen to understand materialities through two dimensions: Infrastructure and technologies and Geographical locations and spatial context. In the following, I will elaborate on these, giving examples and theoretical references.

- **Infrastructure and Technologies**
  In order to produce aeromobilities, immobile infrastructural assets such as airport capacity are important to address (Urry, 2007, p. 19). This can be done both in relation to the facilitation of passengers or flight operations. As I will illustrate later in the case of Zurich Airport and Schiphol Airport, the capacity challenges here are an important driver for production of aeromobilities at these locations. In some cases, capacity issues might not currently be a challenge, but it is an important dimension to be aware of since it can be costly to develop new capacities later and these can also cause increased conflict with local and regional stakeholders. In addition to this,

the landside infrastructures such as rail and roads provide capacity for on the ground, airlines do I also consider as a materialities, since they facilitates capacity in the air just as rail and roads provides on the ground (Urry, 2007, p. 19).

- **Geographical Locations and Spatial Context**
  An important dimension in the production of aeromobilities is the geographical location and the relation to the local, regional, national and global dimension (Kesselring, 2009, p. 48-49). This relates to both where the airport itself is located and positioned in relation to local inhabitants, but also in relation to regional setup where an increase in aviation activities can intensify conflicts (Kesselring, 2009, p. 52). Such dimension will I illustrate in the case of Brussels, where the federal system have impact on the development of aviation. Additionally, the spatial dimension of Finland imposes a need for domestic coherence, which to some degree is linked to the development of aeromobilities. Along with these materialities, the case of Zurich illustrates that relation to neighboring Germany is a driver of aeromobilities due to a conflict of flightpaths. Neighboring countries also influence passenger flows, as I will illustrate in the example of Copenhagen, but also in the negotiation of traffic rights, as I will address in the case of Helsinki.Therefor, In addition to the local and regional dimensions that influence the production of aeromobilities, the global relations – both historical and present – plays a vital dimension in understanding the making of hub airports (Cresswell, 2006, p. 259). This global position is exemplified in the case of Amsterdam, with its link to the former colonies, but also in the case of Helsinki and Brussels.

It is important to be aware of the materialities dimension (both current and historical) in order to understand the driving forces behind the making of hub airports. Policies unfold together with materialities, and therefore the dynamic causalities relate to both materialities and policies on a local to global span. These intertwined dynamic causalities are all influenced by certain meanings or rationalities associated with the production of hub airports as addressed in Chapter: 4 Theory of Science.

For an understanding of the driving forces, I have chosen to analyze the underlying dynamic causalities, discourses and rationalities within the aviation systems in my case studies by looking at the making of hub airports through the lenses of Policies and Materialities. These two dimensions, Policies and Materialities, constitute my theoretical lenses to analyze my generated data. It is important to stress that the political and material dimensions can be interlinked and related, but for analytical reasons I will initially separate them. Below I have illustrated my theoretical framework for the making of hub airports based on a governance approach founded in the dynamic causalities and rationalities related to Policies and Materialities. The framework relates to several dimensions within the making of hub airport; both the

two dimensions of Policies and Materialities, which are interrelated both within each dimension, but also in relation to each other via the objectives in the open system that generates the dynamic causalities. The local to the global relations are also a dimension that needs to be addressed in the hub airports embeddedness in society in order to understand the discourses, the underlying rationalities and the governance of the hub airport.

Figure 12: Theoretical framework for understanding hub airport governance (own creation).

Based on this theoretical set of lenses I will, in the coming chapters, present and analyze my four different cases in order to understand the making of hub airports.

6.6 EPILOGUE

During the last decades, there have been a development in Western democratic politics from a governmental approach towards a governance approach, where politics have been redistributed from traditional political institution towards other political institutions and corporations in various forms. Due to this shift in structures, there is a need for some kind of coordination between various institutions, corporations and other stakeholders to synthesize objectives in order to prevent failures – either market failures or state failures. Jessop suggest a theoretical governance framework to setup such a coordination mechanism:

- *Simplified models and practices* enabling a reduction in complexity, but still in line with the focus of the given stakeholders involved.
- A *knowledge of the causal processes and their relatedness,* including *assignment of responsibility and competencies* to act and coordinate.
- *A framework of methods* to align actions across different stakeholders.
- *Establishing a common worldview among stakeholders* and a system that can settle key stakeholders' focus areas, expectations and behavioral approaches.

With departure in this basic framework, I will develop a hub airport governance model throughout this thesis. As illustrated in the literature overview regarding airport governance models, this research area is not developed. To understand the driving forces of hub airports, I will argue that my model for understanding airport governance will be based on different Policies and Materialities:

- **Policies** consist of strategies from corporations with in the aviation industry and politics consist of politics on different scales from local spatial plans to international politics.

- **Materialities** consist of different forms of infrastructures, technologies, geographical locations and spatial contexts.

After I have presented this theoretical framework for understanding hub airport governance I will in the coming chapters begin my analysis of case airports.

Through the lenses of Policies and Materialities, in the coming chapters analyze the international case studies. First process is to understand the dynamic causalities, and based on articulations and practices I will identify discourses and the underlying rationalities. Last, I will based on the analysis for each case I will identify learnings that can enable me to develop a model of understanding hub airport governance.

7 CASE – AMSTERDAM

> *"Aviation used to be initially a luxury for the happy few, then it became an instrument and something like a standalone sector and now it's become an essential element of society." (Head of Group Strategy & International Development at Schiphol Group, Schiphol airport 2016: 0:03:34)*

7.1 PROLOGUE

Aviation has been a significant driver for developing societies. Developments within aviation continue and in this ongoing process, an important question arises as to how or why some cities and regions have been able to attract or develop aviation more easily and successfully than others. Handling aviation is different from society to society, and as Urry states[42], *"all societies deal with distance, but they do so through different sets of interdependent processes and these include various discourses of movements" (Urry, 2007, p. 47).*

The conventional approach to understanding the development of aviation is by understanding the catchment area or other industry variables. As stated by Head of Aviation Practice at SEO Amsterdam Economics, *"…you see that Amsterdam has decent catchment area and not as good as Heathrow, not as good as Paris.…, we like to travel, a lot of trades so I think that is a good starting point" (Head of Aviation Practice, SEO Amsterdam Economics, 2016: 0:07:40).*

I do agree that catchment area is important, however in line with my meta-theoretical and theoretical position, I argue that several dynamic causalities and discourses actually influence such development. I will, through the lenses of Policies and Materialities unfold the dynamic causalities and associated discourses and the link to the underlying rationalities that have won hegemony behind the production of aeromobilities and making of a hub airport at Schiphol Airport.

Through my collection and analysis of data, I have identified some dynamic causalities that have been key in the production of aeromobilities in the Netherlands.

One important dimension in understanding the current production of aeromobilities is to beware that aviation historically has supported the link between the former colonies in the Far East and the Netherlands. This outwards focus have supported the attention towards aviation.

[42] This quote is also used Chapter: 3 Aeromobilities

The spatial development of Schiphol Airport is founded on a long tradition in the Netherlands of reclaiming land and building dikes. Therefore, spatial planning, including that of infrastructure, has been one aspect within the system that has enabled and supported a positive political agenda towards the development of aeromobilities. Further, there is a dynamic causality between the metropole of Amsterdam and the Schiphol Airport, as illustrated in the Municipality of Amsterdam's part ownership (20.03%[43]) of Schiphol Airport and the articulation of the airport as part of a larger metropolitan strategy. Finally, KLM, which is the largest airline at Schiphol Airport, has been a key factor in the overall mainport strategy, and KLM will set the direction for the future development of aviation in the Netherlands.

These dynamic causalities – or some of them – are not unique for the Netherlands, but when combined with the underlying discourse, these have been drivers for the successful production of aeromobilities and making for a hub airport in Schiphol Airport

Foremost, I will argue for a discourse: Balanced hub aviation as engine for society. This discourse is founded on articulations and practices that not necessarily are pointing in the same directions. On one side, I will argue that aviation in the Netherlands is understood as being more than just aviation. Aviation is not be considered a stand-alone business, but rather as a national strategic instrument articulated in a mainport strategy, where the whole is greater than the sum of its parts. In addition; there is a focus on hub airlines in Schiphol Airport and this have won hegemony in relation to leisure traffic[44]. Further, a long-term liberal related on traffic rights has formed a practice of being first-mover in relation to negotiation of bilateral agreements, which have generated significant connectivity.

On the other side, aviation is perceived negatively based on its externalities, the restrictions of flight operations in Schiphol Airport can be seen as a practice that supports this view. These contractionary views are addressed via a practice based on a consensus-decision model.

It is in this nexus between these different causal dynamics, articulations and practices which enforce and enable each other that the production of aeromobilities takes place in the Netherlands. When analyzing this case through a governance perspective I will highlight that the production of aeromobilities and making of hub airport in Schiphol Airport is based on a consensus model, where different viewpoints are synthesized. The making of hub airport in Schiphol Airport is based on the acceptance of

[43] See: https://www.schiphol.nl/en/schiphol-group/page/shareholder-information/ Located: 31 May 2018.
[44] The focus on airlines facilitating hub function at Schiphol Airport can be seen in the selection criteria, which will come in to action 2019 (Royal Schiphol Group, 2017a, p. 8] – and which I will elaborate late on in this chapter.

externalities and the way to overcome this challenge, the leisure traffic will be distributed traffic to Lelystad Airport. This way of govern the production of aeromobilities can be linked to the discourse I have identified.

I will argue for these findings through an analysis of interviews conducted throughout 2016 and key documents such as *White Paper on Dutch Aviation* and *Schiphol Action Programme* and various academic articles.

Before I begin my analysis of Schiphol Airport, I will briefly list some of the most significant literature and articles that have analyzed Schiphol Airport from different perspectives.

Building castles of the air; Schiphol Amsterdam and the development of airport infrastructure in Europe, 1916-1996. This book describes and analyzes the development of Schiphol Airport as a consequence of the historical development of the Netherlands and the city of Amsterdam. It is very comprehensive and draws on political and legal aspects related to the development of Schiphol Airport. The book seeks to determine the factors that have generated success in Schiphol, in contrast to the Zurich and Copenhagen Airport. The book highlights in its conclusion that success of Schiphol Airport is due to the political attention towards strengthening the airport based on the focus from KLM, which gave Schiphol Airport an advantage. Bilateral international agreements regarding traffic rights and airport capacity have been some of the key success drivers for Schiphol Airport. As I will show in my analysis, I have found some to the same drivers, and in addition to these findings, I will try to seek to understand some of the rationalities behind these drives. Besides the identification of these findings, the book pinpoints that technological development did challenge the transfer hub in Copenhagen Airport between Scandinavia and Europe due to the rise in the use of jet aircrafts and the possibility for more point-to-point service (Dierkx & Bouwens, 1997, p. 293].

On the Move: Cresswell approached Schiphol Airport from a mobilities perspective in this book, where the airport is viewed as a space of flow and where the current production of mobilities is a consequence of history and politics (Cresswell, 2006). He argues that the construction of this node in a global network is a consequence of history in terms of constructing a link between former colonies and the Netherlands. Second, the mobilities are a function of the European idea of free movement. Third, the region of Schiphol is a mixture of different personas, from the homeless man to the taxi driver to the kinetic elite. As Cresswell states, "*There is no system on earth that quite so explicitly makes the existence of a kinetic hierarchy so clear*" (Cresswell, 2006, p 223). Fourth, it is important to pay attention to local service people who facilitate a global flow machine. Finally, it is pivotal to understand that that an airport is not a non-place but is situated within a historical and geographical context (Cresswell, 2006, p. 256-257).

The Airport Assembled Schiphol Airport. This Ph.D. dissertation focuses on the development of Schiphol Airport in the light of planning and policy making. Jong is making use of an ANT approach and he concludes that the foundation for development needs to be based on a wider approach, not only technical planning and policy making, but with a focus on "*on multiple networks of associations respecting different spatialities and temporalities with different opinions and interests, as well as the issues, themes and organizations emerging from them*" (Jong, 2012, p. 278).

"From Airfield to Airport an Institutionalist - Historical Approach to the Development of Amsterdam Early Airport Schiphol, 1916-1940". This article has a historical focus on the development of Schiphol Airport. In it, the authors argue that there has not been sufficient research done on this topic as they state: "*research focusing on the wider implications and interdependency of airport and urban development has been scarce*" (El Makhloufi & Kaal, 2011, p. 498).

Towards a Metropolitan Governance in the Schiphol Airport Region. This master thesis investigates the network of governance institutions in the Netherlands that influence the development of Schiphol Airport and monitor such elements as land use, noise, economy, etc. The analytical approach is based on a large number of interviews conducted with experts and stakeholders wherein five different discourses involving influencing bodies were identified: Aviation Growth, Sustainable Change, Economic Growth, Governance and Market and Government and Market. (Fain, 2014, p. IV-VI).

"The (mis)fortunes of Exceeding a Small Local Air Market: comparing Amsterdam and Brussels". The article analyzes the difference in connectivity performance between Schiphol Airport and Brussels Airport and explores the reasons for this. The article recognizes that some of the difference in the higher performance of the Amsterdam Airport is due to strategic planning from the government and public authorities (Burghouwt & Dobruszkes, 2014, p. 618).

"Governing structures for Airport regions: Learning from the Rise and Fall of the 'Bestuursforum' in the Schiphol airport region". This article analyzes the development from 1987 to 2012 of the Governance Forum concerning spatial development around Amsterdam Airport. From being a central governance structure in airport region, the Governance Forum lost its influence due to its inability to adapt to new cultural and economic development (van Wijk, van Bueren, & Te Brömmelstroet, 2014, p. 149).

These books and articles presented there are just a sampling of the materials that analyze the Schiphol Airport from different perspectives. The literature and articles focusing on aviation development around Schiphol Airport are extensive compared to the academic literature concerning aviation development in Denmark (see section: 2.4). The articles regarding Schiphol Airport have different perspectives: some focus on the spatial development, how to govern developments and the associated

discourses. Others focus on the historical development or the differences between Brussels Airport and Schiphol Airport. I approached the issue by analyzing the governance of Schiphol Airport through the lenses of Policies and Materialities in order to understand the dynamic causalities and the underlying rationalities that will supplement the understanding of what drives the production of hub airports, along a focus on gover

7.2 COLLECTING DATA

Throughout 2016, I conducted ten interviews with professionals who are all involved in Dutch aviation in some way. A holistic perspective drove my selection of the interview persons.

The interview persons included the Head of Group Strategy from Schiphol Airport, Vice-President for KLM Strategy, professors, senior consultants and senior representatives from tourist organizations, confederation of industries, labor unions and the Ministry of Infrastructure and Environment. In addition to these interviews, I also participated in a workshop at the Amsterdam Airport focusing on the development of aviation in the Netherlands[45]. This workshop aided in the development of my overview and introduced me to multiple aspects of the challenges Schiphol Airport is facing.

As addressed in the Chapter 5 Methodology, it can be a difficult process to identify the right people to serve as interview subjects in order to have a robust sample and a further challenge lies in scheduling the interviews with the selected participants. Despite the challenges, considerations and multiple emails back and forth, I did manage to setup these interviews, which I find robust enough to provide me with insights and understanding of how Dutch society handles aviation and how aviation influences Dutch society.

Conducting the interviews and analyzing key strategic documents helped me understand some of the key thoughts and ideas behind the development of aviation in the Netherlands. It is always difficult to pinpoint what triggered a certain development, but during the interviews and readings, it became clear quite early on that aviation in the Netherlands is perceived as more than just a stand-alone business.

[45] At the workshop, different professionals from Schiphol Airport, Copenhagen Airport and a consultancy firm participated. Included in the workshop were Head of Group Strategy & International Development at Schiphol Group (AMS), Corporate Development at Schiphol Group (AMS), Airport and Airline Account Manager (AMS), VP External Relations (CPH), Director of External Communication & Public Affairs (CPH), Public Affairs Manager (CPH) and Head of aviation practice SEO Amsterdam Economics.

In Table 6 and Table 7 are my interview persons and selected documents.

Representing	Interview persons	Company/Organization	Title
Ministry	Cor van Wijk	Ministry of Infrastructure and the Environment	Policy advisor
Ministry	Johannes Haverkate	Ministry of Infrastructure and the Environment	Airport Development Policy Advisor
Ministry	Hugo Gordijn	Ministry of Infrastructure and Environment	Senior researcher
Airport	Gerben Broekema	Schiphol airport	Head of Group Strategy & International Development
Airline	Pieter Cornelisse	KLM	Vice President Mainport Strategy
Business Confideration	Marnix Koopmans	VNO-NCW-MBK	Secretary; green growth, transportation and
Tourism organizations	Jos Vranken	NBTC Holland Marketing	Managering director
Unions	Dirk Kloosterboer	FNV	Researcher
Academia	Pablo Mendes De Leon	Leiden University Law	Professor of Air and Space Law
Academia	Guillaume Burghouwt	SEO Aviation Economics	Head of Aviation Practice

Table 6: Persons interviewed during my field trip in the Netherlands.

Document	Topic	Type/ Year
White paper on Dutch aviation	Aviation strategy	Policy document / 2009
Schiphol Action Programme	Aviation strategy	Policy document / 2016
Annual report from Royal Schiphol Group	Airport strategy	Company policy / 2015-2017
Advies Alderstafel middellange termijn	Governance recommendations	Recommendations / 2008
Advies shared vision Schiphol, deel II	Shared Vision	Recommendations / 2013
The Connecting Landscape, Council for the Environment and Infrastructure	Advisory report	Recommenations / 2016

Table 7:Selected documents used for analyzing aeromobilities in the Netherlands

Before I start my analysis of the material through the political and materialities lenses, I will briefly in next section elaborate on the historical development of Schiphol Airport.

7.3 HISTORY OF SCHIPHOL AIRPORT

Schiphol Airport is located southwest of the city of Amsterdam in the area of Randstandt, which also includes the cities of Haarleem, Leiden, The Hauge and Rotterdam (Dierkx & Bouwens, 1997, p. 61).

Figure 13: Schiphol Airport is located just south-west of the city of Amsterdam. (Google Map, 2018h)

The history of Schiphol Airport begins in 1916 when the airport was constructed as a military airport. It served in this capacity for only two years, and in 1918, Schiphol Airport became a civil airport. The first significant infrastructure development took place in 1928 when the Dutch state sold the airport to the Amsterdam municipality. The airport became one of the best developed and most modern in all of Europe, due to the Netherlands being named as host country to the 1928 Olympics and the connectivity to the Dutch colonies (Jong, 2006, p. 6). During WWII, the Germans and allied forces heavily bombed Schiphol Airport. In the reconstruction phase, the Dutch government took a leading role as they recognized the importance of an airport in order for the country to regain economic strength. The rebuilding of the airport took longer than expected, and during this process the new public limited company, the Schiphol Group, was founded. It was a constellation between the municipalities of Rotterdam and Amsterdam and the Dutch government[46]. As technological developments in aviation, including the production of the jet engine, grew, the cost for air travel decreased. This, combined with people having more money to spend on travel, led to an even more rapid development of aviation in the 1960s (Jong, 2006, p. 7).

Increased air travel created a need for further expansion of terminals, runways and infrastructure in the surrounding communities. During the late 1960s and into the 1970s, there was growing debate concerning the externalities of noise in relation to the surroundings. Schiphol Airport is located in an area with high population density. One of the solutions to the noise issue was the construction of a fifth runway so as to

[46] In 2017, the ownership of Royal Schiphol Group: State of the Netherlands 69.77%, Municipality of Amsterdam: 20.03%, Groupe ADP: 8% and Municipality of Rotterdam: 2.20 % (Royal Schiphol Group, 2018a, p. 220]

distribute the noise more evenly, but due to public debate the fifth runway was postponed. To accommodate this challenge, another debate arose as to whether or not to build a new airport in the North Sea (Jong, 2006, p. 7). Not only did that airport itself develop, in 1978 the Schiphol Railway opened, making it easier to get back and forth to the Schiphol Airport. During the 1980s, commercial infrastructure including shops airside and landside was built.

The largest commercial area landside, Schiphol Plaza, served as a nexus between railroads and roads leading to and from the airport opened in 1995. Finally, in 2003, the fifth runway, Polderbann, was finalized and operational. Unfortunately, this was not a clear success. The noise complaints from the surrounding neighborhoods increased significantly, mostly due to the new flight paths over populated areas that had not experienced this externality before. Further, the increased capacity could not be used simultaneously with the existing runways; one of the main ideas was that the new runway could be used together with the Zwanenburgbaan, but it turned out that this was not an option due to operational danger (Jong, 2006, p. 7). In order to accommodate the growth perspectives along the noise externalities, Alders Table was founded in 2006 by Dutch government, named after the chairman, Hans Alders (Jong & Boelens, 2014, p. 8). Alders Table is an advisory commission to the Dutch government. The commission consists of of representatives of: Schiphol Group, KLM, Air Traffic Control the Netherlands (LVNL), the former Ministry of Spatial Planning, Housing and the Environment (VROM), the former Ministry of Transport, Public Works and Water Management (V&W), the municipalities of Amsterdam, Amstelveen, Uitgeest, Haarlemmermeer and the Province of Noord-Holland, organized in the Bestuurlijke Regiegroep Schiphol (Managerial Directing Group Schiphol, BRS), and local residents organized in the Commissie Regionaal Overleg luchthaven Schiphol (Regional Schiphol Airport Consultation Committee, CROS) and the Vereniging Gezamenlijke Platforms (United Platforms of Residents against Airport Nuisance, VGP). (Jong, 2012, p. 108). In 2008, the commission recommended setting a cap on flight operations at Schiphol until 2020, a redistribution mechanism of traffic between regional airports in order to focus on hub traffic at Schiphol Airport (Alders, 2008, p.4) (see: section: 7.5.2 Policies – The Duality of Aviation) . Along with this main recommendation, the Alders Table also encouraged other initiatives to accommodate the challenges.

I will later in my address the Alders table more thoroughly. Along with the process at Alders Table, the physical expansion of Schiphol Airport continued. After opening the fifth runway in 2003, departure hall 1 was expanded and the 7th pier was commissioned in 2005. A new VIP center (2008), a new baggage hall (2010), new general aviation terminal (2011), new security filter (2014) and a renewal of departure hall 2 (2016) followed (Royal Schiphol Group, 2017b). Currently, there is a new large infrastructure program that had been initiated. This will includes a new pier that is expected to be finished in 2019 and a second terminal to be completed in 2023 (Royal Schiphol Group, 2016).

7.4 SCHIPHOL AIRPORT CONNECTIVITY

In the following, I will shortly introduce traffic development in Schiphol Airport and in the Netherlands before I will begin my analysis.

In addition to this introdcution of the traffic and connectivity development - see Appendix D. Case of Amsterdam Airport, for graphical presentation of major traffic trends.

Figure 14: In the Netherlands, there are five commercial airports. Schiphol Airport is the largest with 90% of all departing seats. The airport is located approximately 10 km southwest from Amsterdam city (Google Map, 2018d)

There are five airports in the Netherlands with scheduled air traffic; Schiphol Airport is by far the largest, with 90% of all departing seats in the Netherlands. To compare the Dutch airports, in 2017 Schiphol had 38.3m departing seats, while Eindhoven had 3.2m departing seats, Rotterdam 1.0 m departing seats, Groningen airport 0.14m departing seats and Maastricht had less than 0.1 m departing seats (SRS seat data). In addition to these airports with scheduled traffic, there are several smaller airports used for general aviation. One of them is Lelystadt, which is currently being expanded to facilitate some of the traffic from Schiphol (see more in 7.5.1.2 Mainport Strategy). Over the last 10 years, from 2008 to 2017, Schiphol Airport has seen a 32% increase in the number of departing seats or a CAGR of 3.1%. In comparison, Copenhagen Airport has had an increase over the same period of 23% or a CAGR of 2.3%[47].

In the three largest airports, there are the following distribution of the largest airlines traffic. The largest carrier in Schiphol Airport is KLM with 49% in 2017, easyJet: 8% and Transavia with 7% of all departing seats. In Eindhoven, Ryanair has a share of 46%, Transavia 30% and Wizzair 22%. Finally, in Groningen Airport, Transavia holds 80% and British Airway 11% of all departing seats (SRS seat data).

[47] When comparing two developments, the starting year is always important to determine the relative development. If applying another starting year within 2008-2017, the relative development is still the same in this case: Schiphol Airport still has higher growth rates compared to Copenhagen Airport.

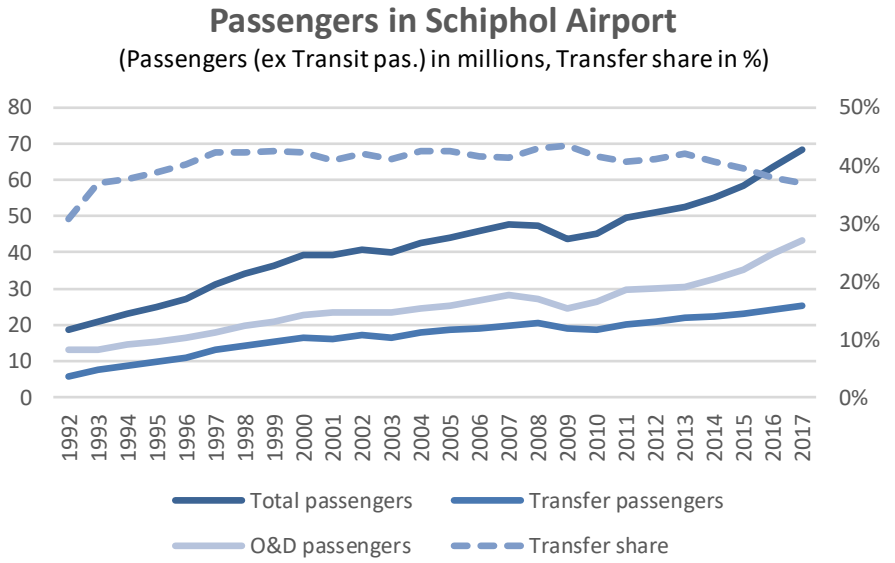

Figure 15: Schiphol Airport had in 2017 more than 68m passengers and a transfer percentage of 37% - the airport is one of largest airports in Europe (Royal Schiphol Group, 2018b).

The Schiphol Airport has had a significant development in traffic from approximately 20 million passengers in 1992 to more than 68 million passengers in 2017 (Royal Schiphol Group, 2018b). As stated in Introduction and Motivation in the late 1970s, Copenhagen Airport and Schiphol Airport had roughly the same number of passengers, and now Schiphol Airport has 2.3 times as many passengers. Measured in Airport connectivity; Schiphol Airport is the fourth largest airport in Europe[48].

In Schiphol in 2017, European destinations constituted 71% of all seat capacity, while long-haul traffic constituted 29% and there was no domestic traffic (SRS seat data). The largest European destination is UK with 23%, than Spain and Germany each with 10%. The large ratio of traffic to UK can be seen in relation to the historical promotion of Schiphol as Heathrow's third runway[49]. Long-haul destinations constitutes 29% of departing seats; North America: 37% of all long-haul traffic and Asia with 24% (SRS seat data). The transfer share in Schiphol Airport was in 2017: 37%, which is a slight decrease in relation to the period: 2010-2017, where the average transfer share was

[48] These rankings are based on ACI Connectivity report 2017 - appendix. The ranking is relative to the European airports included in the report: Amsterdam, Athens, Berlin, Brussels, Budapest, Copenhagen, Dublin, Dusseldorf, Frankfurt, Gatwick, Heathrow, Helsinki, Lisbon, Madrid, Milan, Moscow, Munich, Oslo, Paris CDG, Prague, Rome, Stockholm, Vienna, Warsaw and Zurich (ACI Europe, 2017b).

[49] See: https://www.standard.co.uk/news/london/heathrow-s-third-runway-is-here-in-amsterdam-says-schiphol-airport-8293726.html

40%. From 2010 to 2017, the actual level of transfer passenger has increased by 6.6 million transfer passenger or an increased by 35% (Royal Schiphol Group, 2018b). In 2017, 30% of the transfer traffic was from Europe to Europe, while 59% of the transfer traffic was from Europe to long-haul destinations and 11% from transfer connecting long-haul destinations (MIDT data)[50]. In total, there were 82 long-haul destinations from Schiphol Airport, with an average transfer share of 53%[51]. This indicates how important the hub function is for Schiphol Airport since without transfer flow, the possibility to serve this level of long-haul destinations would be diminished (see section: 2.3 Conventional Aviation Research). In 2017, KLM processes 75% of all transfer passengers, while Delta Air Lines processes 14%. This indicates how important KLM is to the hub function at Schiphol Airport, but as I will illustrate in the coming sections, a strong hub carrier is not the only perspective in making a hub airport, which is the focus of this thesis.

The total *Airport connectivity* at Schiphol Airport has increased by 19% from 2008 to 2017, where the *Direct connectivity* has increased by 21% the *Indirect connectivity* by 19% and the *Hub connectivity* has increased by 53%, while in Copenhagen Airport there has been a decrease of 30% (ACI Europe, 2014; ACI Europe, 2015a; ACI Europe, 2016; ACI Europe, 2017a).

In the next chapters, I will analyze the case of Schiphol Airport. As presented in section 6.4 and section 6.5, I will use two lenses: Policies and Materialities to view my collected data in over to understand the production of aeromobilities. I will argue for objectives that facilities the dynamics causalities along this identifying articulations and practices that imposes the underlying meaning or rationalities. In addition to this, I will also reflect at end of the chapter on how this production of aeromobilities in the Netherlands takes place in the light of my suggested Airport Governance model.

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[50] The split of transfer traffic into transfer traffic between Europe/Europe and Europe/long-haul destinations are based on origin and final destinations. By this, e.g. if a 2nd transfer is taking place at another European airport for travel to US, the transfer in Schiphol Airport is labelled as a Europe/long-haul destinations transfer. Even though the first airport after Schiphol is European. This potential mis-interpretation may only relate to flight paths with more than one transfer airport. In the case of Schiphol Airport (2017), 25% of all transfer traffic did transfer at another airport before or after Schiphol airport (MIDT data). See also Appendix A. Connectivity Data

[51] Total number of long-haul destinations that are operated by scheduled aircraft and full year in 2017 (SRS seat data). The transfer shares are based on transfer passengers through Schiphol and where the last transfer airport is Schiphol Airport (MIDT data). By this approach, I have excluded additional transfer airports after Schiphol Airport to reach final long-haul destination. As stated in the Appendix A. Connectivity Data, due to challenge with data quantity, I have chosen only to download transfer data from one month: September 2017, since it is a representative month outside holiday seasons, therefore the transfer shares are only approximates.

7.5 THE POLICIES DIMENSION

Advancements in aviation in the Netherlands is possible when a holistic approach to aviation is applied. The analysis of the Policies dimension behind the production of aeromobilities focuses on three central objectives: the *Mainport Strategy*, the duality of aviation and a liberal approach to aviation. These objectives are part of the structure that contains the dynamic causalities behind the production of aeromobilities. I will, as much as possible, focus on the Policies dimension, but as stated in section: 6.5, the Policies dimension is very much intertwined with the Materialities dimension, so sometimes it is not possible to make a clear separation of the two dimensions.

In the next section, I will elaborate on the *Mainport Strategy* that encapsulates multiple stakeholders in a framework that recognizes aviation as a key engine for the Dutch society.

7.5.1 POLICIES – MAINPORT STRATEGY

Before I unfold the different articulation regarding the *Mainport Strategy*, I will briefly introduce the historical development behind this policy. The focal point behind this policy is that aviation is perceived as more than just transport.

The *Mainport Strategy* is an overall strategy for making the Netherlands the largest port in Europe, both by sea and by air, for the trading of goods and connecting of people. The national strategy includes development of Rotterdam Harbor, Schiphol Airport and landside infrastructure. Formulating the *Mainport Strategy* as a grand solution cannot be pinpointed to a specific point in time, but can be seen as a process that has gradually developed. In 1982, a constellation of the Schiphol Group, KLM, NVL (Dutch Association of Air Transport) and the Ministry of Economics began to market Schiphol Airport as an international transport node: Holland International Distribution Center (Jong, 2006). Later, in 1988, the ideas and principles for the mainport was incorporated into the Fourth Memorandum on Spatial Planning from the Dutch Ministry of Housing, Spatial Planning and Environment[52]. This adoption of

[52] In the Netherlands, there is a tradition to produce a new memorandum of spatial planning approximately each decade. The memorandum is a framework and guide for physical planning within the Netherlands and the first memorandum was produced in 1960 (Pellenbart & Van Steen, Paul J. M., 2001, p. 503]. Since then, the second memorandum was published in 1966, the third memorandum in 1974, the fourth memorandum in 1988 and the fifth memorandum in 2001. Beside these cornerstones in spatial planning in the Netherlands, there are multiple other – but smaller - governmental interventions (Council for the Environment and Infrastructure, 2016a, p. 88].

the *Mainport Strategy* placed the development of Schiphol very central in the revitalization of the Dutch economy (Burghouwt & Dobruszkes, 2014, p. 614).

After this short historical elaboration of the mainport strategy, it is important to address the background and drivers for the developing the Mainport Strategy, which I will do in the next section.

7.5.1.1 Burning Platform for Mainport Strategy

In the 1970s and 1980s, the Netherlands was facing economic difficulties due to the gradual loss of competitiveness as a result of higher production costs and strong currency[53], combined with the increased competition from the European Common Market and low wage countries. Especially hard hit were traditional production industries such as textile industries and shipbuilding. The first oil crisis in 1973 did generate growth within the offshore oil and gas sector in the North Sea, but the oil crisis in 1979 caused a deep recession in the Dutch economy following many corporate bankruptcies in the Netherlands. The problematic economic situation continued until the mid-80s, but the unemployment rate was still a challenge until the 1990s (de Jong, Sluyterman, & Westerhuis, 2011; Jong, 2006)

This problem of having a less competitive economy led to a revision of the Dutch economy. Head of Aviation Practice SEO Economics explains and elaborates on the background for the mainport strategy:

> *"I think that has to do with the quite difficult situation in Netherlands was in the 1980's. … we had the Dutch disease … we had a lot of revenue from a natural gas in the Netherlands that we didn't invest wisely which was called the Dutch disease, there was a lot of unemployment's. We did not have a competitive economy and resulting from that there was initiative to revise the Dutch economy and that was the mainport policy. The mainport policy was not only Amsterdam it was also the hub to Rotterdam. Those were seen as like the future engines of the Netherlands. … We traditionally have a strong position in logistics so, then its quiet a natural thing to develop*

[53] The strong Dutch currency is associated with significant export of oil and gas. Throughout the oil crises in the 1970s, Holland did generate significant of inflow of foreign currency from gas production in the North Sea. This was positive for society as it resulted in an increase of national income, but due to inflow of foreign capital, the Dutch currency appreciated. As a result, the Dutch competitiveness of domestic produced goods decreased. Such a situation is described in literature as "*The Dutch disease*" (Bjørnland & Thorsrud, 2016; Buiter & Purvis, 1980)

> *your major port. (Head of Aviation Practice SEO Amsterdam Economics, 2016: 0:17:23)*

The Head of Aviation Practice SEO Amsterdam Economics further elaborates:

> *"I think that the mainport policy was basically a reaction to the restart of economy in the 1980's, it was an initiative to revise the economy but beside the mainport … there were much more initiatives to make that company more competitive to employers and employee organizations trying to keep labor costs at low and at a competitive level." (Head of aviation practice SEO Amsterdam Economics, 2016: 0:17:56)*

As Head of Aviation Practice of SEO Economics states, in order to revive the Dutch economy, the Netherlands needed a future engine to revert the economy and increase its competitiveness. One important element in this process was the development of a mainport strategy.

The establishment of the Common Market in Europe also influenced the focus on competitiveness in the Netherlands. In the Netherlands, there was a concern about marginalization between Great Britain, France and Germany and this concern generated a focus and a political understanding of an increased competitiveness. *"We had the fear of coming at the periphery et cetera. What do we need? We need to be competitive. It's a burning platform. We are a small country. We need to be competitive" (Head of Group Strategy & International Development at Schiphol Group, Schiphol airport 2016: 0:35:20).*

The Secretary at VNO-NCW-MBK supports these challenges and the revitalization of the economy with focus on the mainport strategy:

> *"We lost a big deal [of business] of that in the '70s and '80s. The Dutch government in the '80s was searching for – we have to find another business chance for this society, and they came up with mainport strategy. … That was the policy to make Schiphol and Rotterdam harbor to make them economic engines, because we saw a lot of industry at the time collapse" (Secretary, VNO-NCW-MBK 2016: 0:10:35).*

> *"So we need another engine. We cannot survive only on agriculture, it's not possible. We've got good infrastructure, we've got a good transportation. Let's do something with the harbor and the airport. That was the idea. So, it was really policy action" (Secretary, VNO-NCW-MBK 2016: 0:24:00).*

The common understanding that came as a result of the Netherlands' financial challenges was a platform for rethinking mobilities as a potential response. This illustrates that aviation in the Dutch context was believed to be more than a simple flow of passengers and goods.

In the paragraph below, I will elaborate on the fundamentals of the mainport strategy. A crucial point is that in formulating the policy there are a recognition of the production of aeromobilities take place in the context of multiple stakeholders.

7.5.1.2 Mainport Strategy

As stated in previous sections, the focus on developing aviation was due to a revitalization of the Dutch economy – the country needed a new engine.

The mainport strategy's key objective is to generate a hub airport with global reach and an excellent network built with a focus on economic, social and living conditions in the surrounding areas. A philosophy of focusing on an alignment of stakeholders drove the development of the *Mainport Strategy* to achieve this common goal (Burghouwt & Dobruszkes, 2014, p. 614). Since the early 1980s, the *Mainport Strategy* has developed in steps. There are different elements and focal points, but the primary goal is to develop the Netherlands as a global gateway for cargo and passengers. The Harbor of Rotterdam and Schiphol Airport are the backbone in the mainport strategy. The strategy was not a fully-fledged deal, but a long-term process in order to fulfill the overall goal. Below are some of the key political events with a primary focus on the development of Schiphol Airport and the surrounding communities. It is important to keep in mind that Rotterdam is also a key factor in this development. Further, *Mainport Strategy* would not be possible without the expansion of airlines or shipping companies, but capacity expansion in infrastructure is an important element in order to achieve the overall goal.

The historical development of the Mainport Strategy can be summarized in the following:

Key historical milestones within the mainport strategy:

- Early 1980: The Port of Rotterdam and the Amsterdam Airport are recognized as key elements in the political agenda to become a primary gateway of globally operating sea and air carriers and due to the development in EU, this political strategy was an essential move in reviving the Dutch economy,.(Burghouwt & Dobruszkes, 2014, p. 614)
- 1988: Dutch Ministry of Housing, Spatial Planning and the Environment acknowledge in their 'Fourth Memorandum on Spatial Planning' that Mainport and Amsterdam airport as one of the spearheads of Dutch economy (Burghouwt & Dobruszkes, 2014, p. 614).

- 1989: Masterplan for Schiphol released in quest to fulfill the mainport ambition, from 1989 to 2003 there was construction of terminal, aprons, handling capacity, landside accessibility, new cargo and construction of new runway (Burghouwt & Dobruszkes, 2014, p. 614).
- 1991: A consensus is reached with regard to what direction the airport should develop; this was formulated in the '*Plan of approach Schiphol with outlying areas*' and here the stakeholders who were in favor of expansion plans recognized that growth and expansion had to go hand-in-hand with the associated externalities. Signing the deal to facilitate this was the Ministry of Transport, Ministry of Housing, Spatial Planning and the Environment, the Ministry of Economic Affairs, the Province of North Holland, the Municipalities of Amsterdam and Haarlemmermeer and KLM. The recognition of the balance between growth and the externalities led to the formulation of the 'Double objective' principle, which bases the principle of the *Mainport Strategy* on a focus of traffic growth, including spatial expansion, while at the same time improving the living conditions in the airport region and being mindful of the environment (Burghouwt & Dobruszkes, 2014; Jong, 2006).
- 1995: The Second Chamber of the Dutch Parliament approves expansion of Schiphol Airport and mainport development, including a fifth runway. The agreement was a compromise between the opposing sides. A limitation of 44 million passengers per year was agreed upon as was a plan to search for alternative locations for further growth above the threshold of passengers. Alternative locations suggested included the development of an airport in the North Sea (Burghouwt & Dobruszkes, 2014, p. 614). After evaluation of multiple locations, the development of a new airport on an island in the North Sea was preferred, but due to risk-assessment conducted based on "*operational, logistical and financial*" input from The Schiphol Group (the parent company of Schiphol airport), the reallocation plans were canceled (Jong, 2012, p. 63).
- 1999: The cap of 44 million passengers was increased and as a result of the alternative locations search failing to determine another suitable location for expansion, the government began to focus on Schiphol as the primary location of the airport. During this time, there was a significant increase in capacity at the airport, especially in the areas of peak-hour capacity and landside accessibility (Burghouwt & Dobruszkes, 2014, p. 614).
- 2003: A new fifth runway, Polderbann, was inaugurated, though the runway was not as successful as expected due to operational issues and the fact that new housing areas were now exposed to noise externalities. During this process, a Schiphol law was passed that articulated the importance of Schiphol Airport as part of the mainport strategy, and allowing growth to 600.000 aircraft operations per year (Jong, 2012, p. 69).

In relation to the new Schiphol law from 2002, an evaluation took place and concluded that the new law offered the same noise protection as the previous law (Jong, 2012, p. 64, 70). Thus, the Alders commission was initiated (see section: 7.5.2 Policies – The Duality of Aviation), which gave further guidelines for the government in 2009 to publish an overall vision for development of aviation in the Netherlands. The *White Paper on Dutch Aviation* states, "*The Dutch government aims to achieve an innovative, competitive and enterprising economy and a sustainable living environment. As optimum international accessibility by air is a key condition for achieving these goals, the Cabinet is addressing this aspect explicitly" (Ministry of Transport, Public Works and Watermanagement and Ministry of Housing, Spatial Planning and the Environment, 2009, p. 5).*

In this report, the Dutch government articulates that international accessibility is a key condition to economic prosperity, but it has to be balanced against sustainable living conditions. This highlights an awareness and recognition of the duality of aviation as an enabler for continuously economic growth within the frames of the inhabitants' well-being. In the 2016 *Schiphol Action Programme*, published by Ministry of Infrastructure and Environment and Ministry of Economic Affairs, there is a more explicit focus on Schiphol Airport as a key engine for society. As it is articulates:

> *"Our focus must be on creating the best conditions for a strong major airport: when possible, we steer this effort in the right direction, in order to allow the Netherlands to continue to reap the benefits of a well-run Schiphol Airport, an extensive network of flight destinations, and the opportunities that international aviation has to offer. This is the focus of this Action Programme." (Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, 2016, p. 7)*
>
> *"Of course this should occur in balance with the surrounding environment and within the frameworks set for safety and sustainability ." (Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, 2016, p. 6)*

In the *Schiphol Action Programme*, the importance of Schiphol Airport is highlighted in order to understand the growing international competition that requires the airport to continuously improve its infrastruture and products. Again, this must happen in balance with the local inhabitants and environment.

In order to remain competitive and to improve the connectivity to and from the Netherlands, the *Schiphol Action Programme* defines multiple objectives in order support the development of aviation. These objectives include:

- The hub function for transfer passengers at Schiphol Airport is essential [p. 10).
- Collaboration among different ministries, but also between the 'different stakeholders within the aviation sector, knowledge institutions and interested parties, such as regional governments and trade organizations (p. 12).
- Improved and maintained flight connections through a focus on air traffic rights and aviation treaties in line with business climate and tourism (p. 15-16).
- A focus on costs such as charges, air traffic navigation and regulatory burdens (p. 18-25).
- That ground accessibility to and from Schiphol Airport is key in supporting the development of aviation (p. 26).
- A continued focus on innovation and sustainability. This includes support in the reduction of CO_2 emissions (p. 32).
- Allowance for a capacity to grow. This relates to environmental, operational, security, and airspace capacity at Schiphol Airport. In relation to providing enough environmental capacity, the government policy will remain based on the recommendations from Alders Table. This includes making use of selective criteria, which is a framework that limits the number of operations at Schiphol by moving non-hub related traffic to the regional airports, Eindhoven and Lelystadt (p. 37).
- Providing space for Schiphol Airport to expand, while making sure that there is space for new housing projects in the communities surrounding the airport (p. 45).

  Above list based on the Schiphol Action Programme (Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, 2016) – the page numbers in the bullet points list are referring to this source..

All these objectives are important elements in making aviation competitive and effective through the continued development of the Schiphol Airport, and the focus is on the generic components to ease the transportation system by lowering the cost, improving the processes and providing the needed capacity, while still having a focus on externalities. The interesting element here is the clear focus on hub airlines and on collaboration between multiple stakeholders.

The *White Paper on Dutch Aviation* and *Schiphol Action Programme* articulate that aviation in the Netherlands is considered an engine for society and there is a focus on a wider consultation process between involved parties in order to solve problems.

The Head of Group Strategy & International Development at Schiphol Group, Schiphol Airport, elaborates further when he explains that aviation is an essential element of society. *"Aviation used to be initially a luxury for the happy few, then it became an instrument and something like a standalone sector and now it's become an essential element of society" (Head of Group Strategy & International Development at Schiphol Group, Schiphol airport 2016: 0:03:34).*

He further elaborates that the mission for the airport is to connect the Netherlands to the world:

> *"An operating license [for 99 years] says that we have to serve the mainport objective. That's the pre-condition. That's what I also say about the hierarchy of thinking. Connecting Netherlands is our mission, but on top of that, we have an assignment. It's basically an assignment that comes with the operating position, upholds the mainport development … You always have to act in the interest of the Netherlands society." (Head of Group Strategy & International Development at Schiphol Group, Schiphol airport 2016: 2:12:55)*

In relation to how important the airport is to the society, an interesting dimension is that he no longer, only view aviation as an enabler for increased in GDP and jobs, but he stresses that aviation also add a social dimension, where aviation also is an enabler for social prosperity:

> *"The old story that we've been telling basically since the 80s about that aviation being an instrument for creating workforce direct and indirect and it adds to the locational factors for international companies … We noticed, and I saw that already some time ago that that story is not sufficient any more. It's an old story, especially now that unemployment rate in the Netherlands is one of the lowest in the EU. Social elements are becoming much more relevant in the minds of people. In our mission [Connecting the Netherlands], we already started to add that social element to it." (Head of Group Strategy & International Development at Schiphol Group, Schiphol 2016: 0:01:40)*

This acceptance of the role of aviation and the airport as an engine for society relates both to generation of jobs and contribution to GDP, but also as a facilitator for social development. Schiphol's mission statement notes this social dimension as it claims their goal as "*Connecting to compete and Connecting to complete*" (Royal Schiphol Group, 2017a, p. 26). In Schiphol Airport's annual report of 2016, they give an example that increased connections to China will increase business opportunities, but also attract Chinese students to study at universities in the Netherlands. This provides a short-term gain for the university, but also serves as an example of how knowledge

and connections are interlinked. In the long run, this Chinese / Dutch network could facilitate further business development when students advance to senior positions at different corporations (Royal Schiphol Group, 2017a, p. 27).

In addition to the Mainport strategy, the KLM also plays vital part for the connectivity in airport (see section: 7.6.4 KLM). An interesting perspective is the political involvement in the development of KLM. After Air France and KLM merged in 2003, there was a concern in the Dutch government, that the merger would challenge the development of long-haul traffic from Schiphol Airport. Since Paris CDG Airport, had much stronger position in terms of feeder network for its long haul destinations, which gave Paris CDG Airport a competitive advantage, even though the two airports almost served the same number of destinations. Further, the distance between the airports is only 400 km, and therefore the Dutch government feared that the new airline constellation: Air France KLM, would prioritize Paris CDG Airport in an optimization process or when adding new capacities, which could challenge the connectivity from Schiphol Airport. Consequently, the Dutch government agreed with Air France KLM to safeguard the hub function in Schiphol Airport by a State Assurance. This assurance involved a guarantee, that Schiphol Airport still would have 42 long-haul destinations for a period of five years. The State Assurance also had a guarantee that the new airline, would develop the two airports on an equal basis (Burghouwt, 2014, p. 33-34).

This illustrates the understanding of how important long-haul connectivities are perceived in the political system in the Netherlands. This political awareness in relation to a merger of a national carrier is also seen in Switzerland. After Lufthansa's takeover of Swiss there was established a commission in Switzerland: "*Swiss Luftfahrtstiftung*" in 2005 to monitor the connectivity development in Zurich Airport (see section: 10.5.4 Political and Public Awareness). However in Belgium, Lufthansa takeover of Brussels Airlines is approached much more passively (see section: 9.6.3 Development of Sabena and Brussels Airlines).

In this section, I have analyzed the *Mainport Strategy* as object within the nexus of dynamic causalities. The *Mainport Strategy* articulates how aviation in the Netherlands is key for the country's competitiveness and prosperity. The strategy was initiated due to the effects of the financial distress in the late 1970s, and is founded on a wide range of collaboration between stakeholders. Further, there is an understanding that in order to facilitate aviation you need address the externalities affecting local inhabitants by involving a wide range of stakeholders. In line with this, there is also an understanding that aviation generates more than just jobs and contribution to GDP; aviation provides social prosperity. Beside the articulations regarding the development of the Mainport Strategy, this chapter also illustrates the active political involvement in the merger between KLM and Air France, which also illustrates the political awareness of aviation and connectivities.

By focusing on these articulations, I will argue for a discourse in the Netherlands that views aviation as a main engine for prosperity in the Dutch society, but one that has to be balanced with environmental issues. The latter perspective on externalities has a decisive influence on how aeromobilities manifest themselves in the Netherlands.

In the next paragraph, I will elaborate on some the practice that supports addresses this duality of aviation.

7.5.2 POLICIES – THE DUALITY OF AVIATION

The aviation industry tends to have multiple conflicts of interest; the various stakeholders all have strong, independent interests and different view on various aspects. A typical conflict is between airport and airlines. Airlines argue that operations in airports are too expensive or do not provide sufficient capacity at the right service level. On the other hand, the airport has an interest in airlines that are operating more efficiently due to capacity utilization. Better utilization allows airlines to share facilities, referring to this as 'common use area'. Airlines are not always in favor of this approach, due to internal optimization or marketing positioning[54]. Between airlines, there is intense competition for passenger loyalty, but also competition in relation to different opinions regarding charge structure or service levels provided by the airport. As Kesselring points out, another area of conflict is between the transport system and the local residents over matters of noise or pollution issues (see section: 3.4 What Is an Airport from an Aeromobilities Perspective?).

There has long been debate in the Netherlands concerning noise and traffic growth at Schiphol Airport. After trying for several years to resolve this conflict, the Dutch government initiated a commission in 2006: the Alder Table. Based on recommendations in 2008 from the Alders Table, the Dutch cabinet formulated the *White Paper on Dutch Aviation* (Ministry of Transport, Public Works and Watermanagement and Ministry of Housing, Spatial Planning and the Environment, 2009, p. 16). One of the fundamentals of the study is to find a balanced approach to the development of Schiphol Airport and the negative effects felt by the surrounding areas. As stated by the in the White Paper, *"In achieving balanced development, it is essential to take a comprehensive approach to spatial policy which also takes economic, ecological and social policy into account" (Ministry of Transport, Public Works and Watermanagement and Ministry of Housing, Spatial Planning and the Environment, 2009, p. 4).*

[54] Other conflicts between stakeholders could be in respect to new capacity at the airport, charges structure, charge level, regulation model, incentive model or production facilities and allocation of resources.

This conflict is referred to as the "double objective", *explained here as, "The Double Objective. Which was growth of mainport Schiphol but at the same time no growth in noise nuisance" (Head of Aviation Practice SEO Amsterdam Economics, 2016: 0:20:12).*

The Alders Table consists as stated previously of representatives of various stakeholders in and around the Schiphol Airport, including Schiphol Airport management, KLM management, national government, local government, local municipalities and local residents.

This is not the first time in Dutch history that an approach like the Alders Table has been used to solve difficult situations where participants with different interests have to find a common solution. Such a consensus-building decision-making approach in the Netherlands is referred to as a "polder model". As the Managing Director of NBTC states,

> "*Our infamous polder model which you may have come across before. What we call in Holland the polder model as in the flat land that was gained from the water and the sea, which took many negotiations, many opinions. But at the end we come to one consensus and agreement. Here too there was the Alders table*" (Managing director, NBTC Holland Marketing 2016: *0:05:20)*

In the book "*The Netherlands and the Polder Model*", by Maarten Prak and Jan Luiten van Zanden, the polder model concept is used to describe a specific Dutch way of policy-making. The polder model is explained as the "*practices of broad consultation and the capacity to achieve compromise among a multitude of organized bodies"*[55] *(De Vries, 2014, p. 101).*

The concept of polder models has a long tradition in the Netherlands. The agreement, or Wassenaar Accord, in 1982 between labor unions, employers and government is labeled as one of the more recent examples where the polder model is the foundation for reaching such an agreement (De Vries, 2014; Prak & Van Zanden, 2014). The polder model dates back to the 17th century, when there was broad collaboration among local institutions and the global network. This is evident in "*[t]he interactions between localized institutions and global commercial networks moreover, allowed Dutch merchants to dominate the world-economy of the seventeenth century and to produce a remarkable number of large multi-nationals in the twentieth century" (Prak & Van Zanden, 2014, p. 125).*

[55] The book *The Netherlands and the polder model* (2013) have I not been able to located However, in the journal: *Low Countries Historical Review* there is a debate between the books authors and three other academics. It is this debate between the main authors: Prak and Zanden, and the debaters: De Vries and Davids&Hart that I am quoting.

A key feature of the polder model is the "*spelverdeler"*. The "*spelverdeler*" is in charge of the decision-making process; the person is an active participant in mediating the dispute between the involved parties. The person is "*not overwhelmingly dominant … since this would remove any incentive for others to participate. … neither too strong, nor too weak, but exercises powers that suffice – just suffice – to lubricate the processes of interest group negotiation and decision-making*" *(De Vries, 2014,* p. 103).

The polder model is not the only approach to reach a difficult settlement agreement, but the approach is an accepted one to aid in the development of mutual agreements that involve different stakeholders.

The Alders Table or Alders Commission may be viewed in line with the concept above, and as I will claim later an example of how airport governance can take place. Hans Alders was the *"Spelverdeler"* at the first gathering of the Alders Table and the involved parties that constituted the different viewpoints. In October 2008, the Alders Table presented their recommendations to the government.

As the Head of Aviation Practice SEO Amsterdam stresses, an Alders Table approach is the perfect way to overcome some of the difficulties when there are strong conflict of interest present.

> *"Alders table is a perfect example of collaborative decision making and how to overcome the deadlocks by give and take mentality and by setting up a group of stakeholders that is most important for getting things done. Listen to each other, have certain rules on the table so about confidentiality, about transparency of result, about how you behave on such a stable." (Head of Aviation Practice SEO Amsterdam Economics, 2016: 0:27:30)*

He further argues that the involvement of local communities was key to finding a solution.

> *"They were very important in that process but I think that Alders quickly realized we need the local communities, we need the local inhabitants to be part in the solution. Otherwise it's not going to work and we are going to end up in a kind of a deadlock." (Head of Aviation Practice SEO Amsterdam Economics, 2016: 0:30:42)*

The end results of the Alders Table discussion was that the traffic at Schiphol Airport should be limited to 510.000 operations[56] in 2020, including a limit on late night and

[56] The maximum number of operations have been debated and reassessed. According to Schiphol Airport's annual report in 2017, the maximum number of operations is now 500.000 by 2020 (Royal Schiphol Group, 2017b, p. 7].

early morning operations due to externalities. Airlines operating at Schiphol should support the hub function and other traffic types, such as point-to-point leisure, should be moved to the regional airports of Lelystadt and Eindhoven. This policy is referred to as selective development of the aviation sector (Ministry of Transport, Public Works and Watermanagement and Ministry of Housing, Spatial Planning and the Environment, 2009, p. 11). The airlines will prioritize based on different criteria in case of capacity shortage at Schiphol Airport (Alders, 2008; Ministry of Infrastructure and the Environment & Ministry of Economic Affairs, 2016). The Alders Table representatives ranked the traffic from one to five, where category five will have lowest priority at Schiphol Airport and future traffic at the airport is to be prioritized by this Alder Table criteria (Alders, 2008, p. 4)[57]. This list is also referred to as the selectivity criteria and applies to:

1. Hub operations consisting of passengers and freight from intercontinental and European hub networks. This includes full-freight from intercontinental destinations.
2. Other intercontinental operations with business passengers.
3. Other European operations with business passengers.
4. Freight.
5. Leisure destinations.

A key point in this ranking of operations at Schiphol Airport is that hub operation and business traffic rank higher than less prioritized leisure traffic. There is a lot of discussion regarding these criteria, and they are still to be implemented. Before the selectivity criteria can be applied, Lelystad Airport needs to have its runway expanded. According to the plan, this work will be completed during 2018 (Royal Schiphol Group, 2017b, p. 8).

Even though these recommendations were based on a consensus-building, decision-making process from Alders Table, the selective criteria and approach were still questioned by different stakeholders.

One perspective of the debate is the distinction between leisure and business traffic. As the Head of Group Strategy & International Development at Schiphol Group, questions, why is business traffic prioritized over leisure traffic? "*Air connectivity for individuals is as relevant as air connectivity to a company. My view is that the whole selectivity thing should be thrown out of the window*" *(Head of Group Strategy & International Development at Schiphol Group, Schiphol Airport 2016: 1:02:40).*

[57] Own translation of: The selective criteria 1-5 from Dutch to English

Similarly, the Head of SEO Aviation Practice is also not very fond of the selective criteria, noting that "*I don't think this selective policy is – now it's not a secret. I don't think that it is successful as a selective policy*" *(Head of aviation practice SEO Amsterdam Economics, 2016: 0:33:25).*

The capacity in Schiphol is limited, and therefore the capacity should be used for routes and destinations that provide the most benefit to the Dutch society. As Head of SEO Aviation Practice continues,

> *"I mean the initial thinking was okay, so, we might have scarce capacity and what are we going to do with this scarce airport capacity? Then you want to use it for that traffic that as most for your economy. Well, so far so good." (Head of Aviation Practice SEO Amsterdam Economics, 2016: 0:33:35)*

The challenge is to evaluate what is best for the Dutch economy: is hub traffic really better than business destinations? As he ask:*"… if you have a 95% transfer route from Trondheim, [Norway] for example, where the 5% Dutch local passengers. It does not add a lot to Dutch welfare. … but we see that in an easyJet flight to business destination has a lot to do with welfare" (Head of aviation practice SEO Amsterdam Economics, 2016: 0:34:38).* In this sense, the selective criteria does not fully adjust for welfare contribution to the Netherlands, since it prioritized hub traffic at Schiphol Airport.

Further, the Vice President at Mainport Strategy and KLM do not see the selective policy as a success, since only Transavia has reallocated traffic to Eindhoven airport and no other carriers have moved from Schiphol.

> *"They [Transavia] grew in Eindhoven. Their growth is outside Schiphol, but all the other carriers, they stayed at Schiphol and this is what happened in the past year this is what's happening next year. I think selectivity policy is a complete failure. A complete failure" (Vice President Mainport Strategy, KLM 2016: 56:06)*

Despite these clearly negative statements regarding the selectivity policy, these recommendations laid the foundation for the *White Paper on Dutch Aviation.*

In addition to the selective criteria, the Alders Table also recommended establishing a fund that could provide financial support to improve environmental quality, especially noise control, in the area surrounding the Schiphol Airport. The Dutch government, Schiphol Airport and the Noord-Holland provincial authority each invested EUR 10m, EUR 30m altogether, into this fund (Ministry of Transport, Public Works and Watermanagement and Ministry of Housing, Spatial Planning and the Environment, 2009, p. 11). This is another example of an acceptance of the duality of

aviation: where the industry have to recognize the externalities and act within these borders.

In 2012, some years after the recommendations from Alders Table in 2008, there were different conflicts between KLM and Schiphol Airport related to Schiphol Airport's investment plans, selective policy and charge level. Consequently, there was established a committee: *Shared Vision* to overcome these conflicts between KLM and Schiphol Airport in the interest of the Dutch society's interests. The *Shared Vision committee* did consist of representatives from KLM, Schiphol Airport and the Dutch government and with Hans Alders as chairman. In 2013, the committee published a report with its conclusions: It is important to have a common vision and strategy based on trust and cooperation between KLM and Schiphol Airport (Commissie Shared Vision, 2013, p. 4). Further; it is important to maintain the hub function with transfer traffic in Schiphol Airport, since a potential loss of such function will have negative economic effects for the Dutch society and the long-haul network provided by KLM. (Commissie Shared Vision, 2013, p. 7). In addition a new charge agreement for 3 years was settled with focus on maintaining the competitive position of Schiphol Airport along an agreement regarding the first phase of an expansion plan. It was also agreed that Schiphol Airport only should invest in international projects that improve the hub function (Commissie Shared Vision, 2013, p. 9). Head of Group Strategy & International Development at Schiphol Group, Schiphol Airport, elaborated on the strategy that Schiphol Airport only invest in elements that supports the hub function in Schiphol Airport:

> *"The reason why we are interested in Mexico City is not because we want to make money. It's the hub of Air Mexico, it's a partner of Skyteam, it's a partner of KLM. It's in our benefit for the Netherlands connectivity to have good connections in Mexico because that creates all this connectivity as an indirect connectivity … The indirect connectivity, we can influence our indirect connectivity by being active in the main gateways in our network. That's how our international policy is formulated. That's how we structured that. We don't see it as a standalone business." (Head of Group Strategy & International Development at Schiphol Group, Schiphol Airport 2016: 1:59:08)*

Along these elements, the *Share Vision* did state the different expectations for KLM, Schiphol Airport and Government; the main components for the mutual expectations are addressed below:

Schiphol Airport is expected to work towards the selective criteria, improve the conditions for KLM and partners within the laws of competition, make sure that new airlines operating at Schiphol Airport improves the hub function and together with stakeholders in particular KLM to make sure of sufficient capacity in for the hub operations (Schiphol Airport, 2013, p. 4)

The airline KLM is expected to continue the development of hub network in Schiphol Airport, recognize that other airlines also supports the *Mainport Strategy* and support and be responsible in relation to airport capacity investments (Schiphol Airport, 2013, p. 5)

The government – and especially the Ministry of Infrastructure and the Environment, as policy maker – is expected to work towards a transparent and simple regulatory framework that enables Dutch aviation to be competitive. Develop regulations and aviation laws that supports the mainport strategy, but also make sure that there are sufficient capacities at regional airports to develop the *Mainport Strategy* and evaluate new airlines whether or not they support the hub function at Schiphol Airport (Schiphol Airport, 2013, p. 5).

This section illustrates two important aspects within the structure that produces aeromobilities in the Netherlands: The duality of aviation and the consensus-driven decision model that strives to address this duality. These matters are elements in the dynamic causalities that make aeromobilities possible.

The interesting finding in this paragraph illustrates the Dutch use of a consensus-driven decision-making model in order to solve *The Double Objective*: growth in Schiphol Airport in relation to externalities. The results illustrate a discourse wherein a focus on hub airlines gained hegemony at the expense of leisure traffic. The restrictions on operations in Schiphol Airport argue for a discourse where externalities and the effect on local residents have to be taken seriously. In addition the *Shared Vision committee*, can be view as a form of Airport Governance body, as presented in section 6.2 and 6.3, where there are established framework with common objectives and practices. One striking element within these practices is that Schiphol Airport should limits its international investments only to focus on elements that improves the network at Schiphol Airport.

7.5.3 POLICIES – LIBERAL APPROACH

In addition to the mainport strategy, the duality of aviation and the consensus-driven decision-making model, there is a need for a liberal approach to aviation as an important objective in the system.

A liberal mindset is a driver or enabler for the production of aeromobilities in the Netherlands. Historically, gaining permission to fly over other countries has been troublesome (see section: 2.5 Limitations within Conventional Aviation Research) – and still to some extent depends on bilateral agreements. Negotiation of these traffic rights has been essential for the Netherlands to develop its aviation system and the Netherlands was one of the first countries to argue for and settle different forms of bilateral agreements to remove restrictions to the production of aeromobilities. The liberal approach has a long tradition in the Netherlands. As the Secretary in the Confederation of Netherlands Industry and Employers states,

> *"We were always very liberal. That is really a Dutch characteristic: 'Mare Liberum' of the sea was invented in Holland. … to think from liberalization as a strength; so open skies in its base is a liberalization. So that's how we always support. Mare Liberum was an example centuries ago, and it's basically the same [as open skies]"* (Secretary, VNO-NCW-MBK 2016: *0:07:59)*

The Dutch philosopher Hugo Grotus formulated the 'Mare Liberum' as a concept in 1633. In the book *The Freedom of the Seas,* Grotus argues that the sea cannot be in anybody's possession: "*Every nation is free to travel to every other nation, and to trade with it*" (Grotius, 2000, p. 12). This same liberal approach in the context of aviation is focusing on removing restrictions on different capacities.

The Open Skies or Air Service Agreement, which is in contrast to the historically regulated traffic between states (see section: 2.2 Development Within the European Aviation Market, does open up access to airspace for multiple airlines, not just the national carriers. Airlines)can fly any route between the two states, there is no capacity control and airfares can be set without negotiation through IATA (Doganis, 1991, p. 75).

The Vice President of Mainport Strategy states that the Dutch have a long tradition of trading and negotiation, which serves as the foundation for the liberalization of air transport. "*I think if you go back in time, it's in our blood to do trade and also in a clever way, to negotiate. Dutch are very good negotiators. Not with power, not with force, but negotiating*" *(Vice President Mainport Strategy, KLM 2016: 0:25:20).*

Because of this approach and its strength in negotiations, the Netherlands was the frontrunner for European countries to have bilateral agreements with the USA in 1978 and the United Kingdom in 1984 (Doganis, 2006, p. 32, 34).

> *"Well, we were the first nation opening skies with the US. The first open within Europe, their first open bilateral was between UK and the Netherlands. Now we were always a frontrunner in the liberalization of aviation. So there is, until the '90s has been a very active policy I think in bilateral – as regards bilateral agreements. We were always very active." (Policy advisor, Ministry of Infrastructure and Environment 2016: 14:22)*

> *"So we were the very first country to have open skies with the UK. … That is more than 30 years ago." (Vice President Mainport Strategy, KLM 2016: 0:26:30)*

Negotiation of bilateral agreements are only negotiations between states; airport or airline might support this process, but in the end, it is only state to state. "*You can't do anything as an airline or at least, even less so as an airport. The government has to do it. It is always state to state -- it's bilateral and it serves agreements between states*" *(Professor of Air and Space Law, Leiden University Law, 2016: 0:27:18).*

Bilateral agreements are a matter of foreign policy, as explained by a senior researcher at the Ministry of Infrastructure and Environment: *"That's also a foreign policy question. People of the foreign office went through the how in making the deal and there was a good cooperation between the parties involved, the KLM and the ministry of foreign affairs" (Senior researcher, Ministry of Infrastructure and Environment 2016: 14:22).*

Along with the development of bilateral agreements, KLM has developed a variety of joint ventures. With the US, KLM and Northwest (now Delta Air Lines) agreed to develop a joint venture.

> *"I think that is also important to consider that their might also be a little bit of luck involved, and I find that also or was interesting that, I mean, if there are maybe would not have been the personal click between the CEO of KLM in those times and North West Airlines and between the Dutch government and the US government, we would not have that Northwest KLM joint venture as well as the open skies treaty with US and in that case the first mover had found advantage from what we still benefit from. I think that at one factor to take it to account as well." (Head of aviation practice SEO Amsterdam Economics, 2016: 0:11:45)*

In this last section dealing with the political dimension, I have argued for another objective in the open system that enables the production of aeromobilities in the Netherlands. This object is the liberal approach to aviation and is associated with an outward perspective. This liberal approach has enabled a shift towards bilateral agreements with the US and UK, which have helped the Netherlands to a first mover advantage in the advancement of its aeromobilities. It is important to understand this liberal approach cannot stand alone. It has to be viewed together with the other political objects within the structures that facilitate aviation suchs as The *Mainport Strategy*, the duality of aviation, the consensus decision model as applied by the Alders Table, and the liberal approach. The liberal approach that facilitated the first move advantages and the development aeromobilities is an example of why the causalities are dynamic in relation to time and space. This driver, the liberal approach to bilateral agreements, could be adopted by other countries today, but it might not have the same effect since the first mover advantage between Europe and the US is not possible to the same extent.

In the next section, I will argue for the material dimension that encapsulated how these policies are unfolded.

After the analysis of the Materialities dimension, I will argue for discourse based on a holistic approach to aviation that is recognized as key engine for society, but also has to be balanced against the externalities the aviation industry produces. This discourse is articulated through the written policies as well as the interviews I have conducted. In addition, it has generated the foundation for the Alders Table and its recommendation also points towards this balanced approach to aviation.

7.6 THE MATERALITIES DIMENSION

In this chapter, I will unfold some of the Materialities that are a foundation for the production of the hub airport in Schiphol. The findings in the Materialities and Policies dimensions constitute the structure that enables the production of aeromobilities through dynamic causalities.

The Materialities are the geographical dimensions that facilitates an outward orientation and a long tradition for spatial planning, including ground transport. Further I will address the airline KLM's function as key infrastructure within the system of aeromobilities in the Netherlands.

7.6.1 OUTWARD ORIENTATION

One of the drivers for aviation in the Netherlands is the outward orientation that the Netherlands has. As the Head of Group Strategy & International Development at Schiphol states, the goal of aeromobilities in the country is

> *"[t]o make Netherlands big. From the very first beginning of aviation, there's understanding about we are a small country and we need that international connectivity. That allows us to be relevant. Relevant economically. I think that is still the basis also. In the 1980s people understood that aviation is powerful." (Head of Group Strategy & International Development at Schiphol Group, Schiphol Airport 2016: 0:34:20)*

Outward orientation is a focus toward other parts of the world and an understanding of the importance of global connections. Like many other small countries, the Netherlands has an open economy with an outward focus since the country depends on the global market for economic prosperity and to increase the sales of goods and services. Other countries, such as Germany or France, are less dependent on the global market since their home markets are relatively large. *"By default, this country has to be open and understand what is out there. By default, if we are externally orientated" (Managing Director, NBTC Holland Marketing 2016: 0:50:14).*

Looking at the export and import share of GDP, this indicates the importance of an outward focus of foreign trade in contrast to an inward focus. Estimations of the export share of GDP in the Netherlands is 82.57%, while the corresponding estimation of imports is 71.72%. It can be discussed what these ratios actually indicate since GDP is influenced by various input elements, but in a like-for-like comparison for the year 2014, these ratios indicate a high degree of outward trading focus. In contrast to the Netherlands, Germany has an export ratio of GDP equal to 45.65% and an import ratio of GDP equal to 39.13%; France has an export ratio of GDP equal to 28.95% and an import ratio of GDP equal to 30.93%. Denmark has an export ratio of GDP equal to 53.38% and an import ratio of GDP equal to 47.32% and Europe and Central Asia has an averages export ratio of GDP equal to 41.46% and an import ratio of GDP equal to 38.70% (WITS, 2016). As a nation, the Netherlands is relatively more dependent on international trade, both imports and exports, than other nations since the Netherlands has higher import and export ratios. Imports and exports relate to different transport modes such as ground transport, air transport, sea transport and the virtual transport of goods. The available statistics do not distribute the value or weight across the different transport modes, but they do indicate an outward focus.

Air transports tend to be a relatively more expensive form of transport, and therefore the goods need to have a corresponding high value, measured either in monetary value or in time value. High valued goods include packed pharmaceuticals or goods with a

short lifespan (i.e., fresh fish) or goods that need to reach the customer in a short amount of time, like critical spare parts for machinery (Goetz, 2015, p. 365). The high ratio of imports and exports is part of a two-way relationship with the development of aviation: higher connectivity improves the foundation for trading and vice versa.

The high amount of current international trade based on the historic position of the Netherlands is a foundation for the outward focus, as the Vice President of KLM express,

> *"I think it has to do with the past and also the feeling to do business, what we had 300 years ago with the VOC, to the Far East. We are a trading nation. If you look into our country and our economy, our economy is an open economy. 70% of our economy is determined by the world economy." (Vice President Mainport Strategy, KLM 2016: 0:23:30)*

Trading with other parts of the world is a fundamental element of the Netherlands' historical trading position starting with colonies centuries ago primarily in the Southeast Asia. Between approximately1600-1800, two Dutch trading companies, the Dutch East Indies Company (VOC) and the Dutch West Indies Company (WIC) enabled tremendous economic growth in the Netherlands by opening up trade with Asia and the Atlantic coast. Along with these trading companies, the Dutch colonies and possessions, including the Netherlands Indies, New Guinea, Gold Coast, Suriname and Dutch Antilles, imposed an outward orientation (Bosma, 2014, p. 154).

This section illustrates that the geographically dimension of such relatively a small country have generated an outward focus that layout the understanding of an open economy. Therefore, the production of aviation takes place within materialities that have a global span due to the location of former colonies and historical trading.

7.6.2 SPATIAL PLANNING – IN A HISTORICAL CONTEXT

A key element in the *Mainport Strategy* is the alignment of the interest among the stakeholders in order to achieving a common goal: *The Double Objective,* which recognizes the need for traffic growth has to be supported by local residents. To support this development, the Dutch government has applied different tasks in developing aviation. One of them is to provide sufficient space for the *Mainport Strategy* to be fulfilled. As secretary at VN-NCW-MBK state*s, "[i]n Holland we've got this very long tradition of spatial planning. What was happening first time was that Schiphol and Rotterdam got enough space, enough ground to grow" (Secretary, VNO-NCW-MBK 2016: 0:10:55).*

As the Secretary states, spatial planning has a long tradition in the Netherlands, which has undergone some significant spatial planning and projects. If one looks at how the Netherlands has claimed land from the sea, these projects have been substantial and required significant planning and resources to complete.

For centuries, the building of dykes and dams has been part of the spatial development of the Netherlands. There have been projects focusing on building dikes in order to prevent the country from flooding or to reclaim areas of land (Pleijster & Veeken, 2015, p. 32). With a Dutch coastline of 2.100 km back in the 1850s, the reclamation of land has resulted in the decrease in the coastline to only 880 km in 2000. Spatial planning not only focuses on reclaiming land, but also on building dykes and dams such as closing large, shallow inland bays like Zuiderzee in order control the sea and to protect the country from flooding.

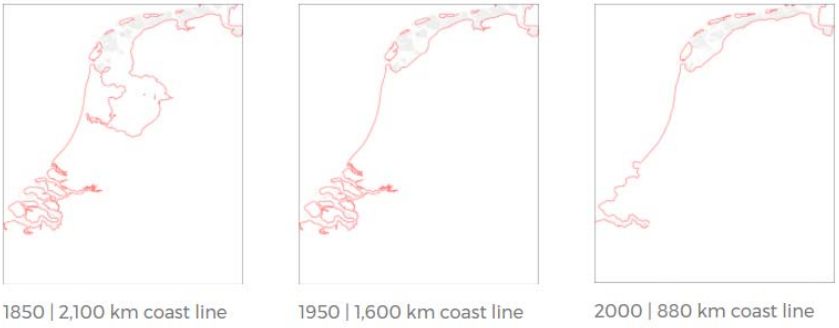

Figure 16: Illustrations of the change in the coastline of the Netherlands from 1850 to 2000; due to dykes and dams the coastline has been reduced from 2.100 km to 880 km. - it is an indication of how important spatial planning has been in the Netherlands, historically speaking. Illustrations based on elements from webpages http://dutchdikes.net/history.

These infrastructure projects of dykes and dams illustrate that spatial planning has been an important issue on the political agenda of the Netherlands for decades due to the growing population. As the Secretary of VNO-NCW-MBK explains, *"In the Dutch context of being very crowded country even more than Denmark, and that is also already a fine crowded country, we are 17 million in Europe. Having this space is really number one" (Secretary, VNO-NCW-MBK 2016: 0:11:20).*

7.6.3 SPATIAL PLANNING – FROM THE 1960'S

The spatial planning have since the 1960s been formulated in different memorandum from the central government approximately every decades. However, the spatial interventions by the Dutch government started in the early 20th century. In the beginning, some of the interventions focused on damming and spatial reclamation from the sea. These interventions were called the Zuider See Act (1918), the First Land Consolidation Act (1924) and Wierringsermeer (1930) (Council for the Environment and Infrastructure, 2016b, p. 88).

The first national spatial planning memorandum is considered to be the one from 1958: *Memorandum Wester Netherlands,* which focused on developing urban areas in the western part of the Netherlands (D. Blom, (Rli), personal communication June 23, 2016)[58]. In 1966, the second memorandum: *Second Memorandum on Spatial planning* was published and the third memorandum in was published in 1966. In 1988, the thought of the mainport policy was included in the fourth memorandum on spatial planning. In this memorandum the airport was recognized as "*one of the spearheads*" the Dutch economy (Burghouwt & Dobruszkes, 2014).

In 2001, the fifth memorandum on spatial planning was formulated. The fifth memorandum was never finalized due to a change in government. The new government wanted further focus on the decentralization process. Despite the fifth memorandum never becoming an official policy, some aspects of the policies were implemented by the provincial governments. The fifth memorandum was replaced by the 6th: *Spatial Planning Memorandum* in 2004, which decentralized spatial planning to provinces and municipalities. After the Ministry of Housing, Spatial Planning and the Environment, and the Ministry of Transport, Public Works and Water Management merged into the Ministry of Infrastructure and the Environment, there was a new memorandum developed in 2012 called *National Strategy on Infrastructure and Spatial Planning* (D. Blom, (Rli), personal communication June 23, 2016). Even though only parts of the fifth memorandum were implemented, since the start of the millennium there has been a push for more decentralization of the spatial planning in order to give the provinces in the Netherlands increased decision-making power in relation to spatial planning.

The Secretary of VNO-NCW-MBK acknowledges that historically, spatial planning has been a centralized governmental process. Since roughly 2000, spatial planning has been more decentralized and decision-making power has been distributed to local communities because, as he states, "*spatial planning from a very central center is of course very inflexible*" *(Secretary, VNO-NCW-MBK 2016: 0:17:05).* The Secretary

[58] The Counci Rli (Council for the Environment and Infrastructure), located in The Hague is the primary strategic advisory for the government and parliament in the fields of the physical environment and infrastructure" See: http://en.rli.nl/ Located 10 July 2018

further states that this can be a challenge when looking to maintain a focus on the *Mainport Strategy* because "*At that time [when the Mainport Strategy was formulated] spatial planning was very much a governmental affair" (Secretary, VNO-NCW-MBK 2016: 0:14:59).*

He continues:

> *"… but since then spatial planning has been decentralized to cities, and more regional authorities… [This] being a problem, because cities do not care that much as our government for a mainport function. So, they want to build houses where we think for the mainport, in this case Schiphol especially wouldn't be that successful.*" *(Secretary, VNO-NCW-MBK 2016: 0:16:40)*

In the *National Policy Strategy for Infrastructure and Spatial Planning* from 2011, the decentralization process of spatial planning is argued by a desire to bring decision-making power closer to the local authorities.

> *"Excessive layers of government, complex regulations and compartmentalization are all too common, and they have a detrimental effect on the development of the Netherlands. Central government intends to bring spatial planning decision-making closer to the stakeholders (individual and companies), delegation more to local and provincial authorities (decentralization as the first option), and focusing more on users.*" (Ministry of Infrastructure and the Environment, 2011, p. 3)

This decentralization of spatial planning is not new, it has been a process lasting several decades and is as an example of a process towards a general governance approach as stated in section 6.2 Governance. However, this decentralization or governance process of spatial planning of central infrastructures has not been part of the same trend. As Priemus marks: in the Fifth and the 2004 memorandum there is an increasing focus on a decentralized process of spatial planning, but this does not account for vital infrastructures such as the Port of Rotterdam or Schiphol Airport, which are still under the influence of the central government.

> *"In terms of the decentralization of spatial planning decision to the regional and local authorities, the Spatial Memorandum goes even further than its predecessor [fifth memorandum]. Central government now wishes to retain direct responsibility only where the competitive position of the country as whole is at stake, as in the development of the two mainports: Port of Rotterdam and Schiphol Amsterdam Airport." (Priemus 2004 p. 580-581)*

This is quite an interesting development in spatial planning: even though there has been a general trend towards a decentralization process of spatial planning, the Dutch government has kept the large infrastructure assets, the Port of Rotterdam and Schiphol Airport, within their premises due to the competitive situation of the country.

This scope of centralized spatial planning was expanded in the *National Policy Strategy for Infrastructure and Spatial Planning* from 2011, when the government defined 13 national interests with equal weight. The central government has the responsibility for these national interests in order reach result that will support overall goal for the country to: "*Create a good quality of life*" (Ministry of Infrastructure and the Environment, 2011, p. 8).

Three triggers define whether an issue is of national interest: "*(1) the issue benefits or drawbacks the country as a whole – e.g. military space or mainports, brainports*[59] *or greenports etc. (2) the issue relates to international obligation or agreements. (3) the issues is of cross-provincial or cross national matter e.g. main roads, water, rail or power supply system users*" (Ministry of Infrastructure and the Environment, 2011, p. 4).

One national interest is "*Creating an outstanding spatial-economic structure through an attractive business climate in and good international accessibility to urban regions where keys sectors are concentrated.*" (Ministry of Infrastructure and the Environment, 2011, p. 9). It is specified that the region around Schiphol Airport is of national importance and therefore the government is "*joining forces with local and regional authorities to strengthen them*" (Ministry of Infrastructure and the Environment, 2011, p. 9).

One key parameter in the *Mainport Strategy* is spatial planning for ground transport access for the airport and for the Rotterdam Harbor. As the Secretary from VNO-NCW-MBK explains, it is

> "*[i]mportant is that there are roads … [for] mainly people to reach Schiphol. There has been built a station, you have entered Schiphol; there is a station beneath Schiphol that is built there following the Mainport Strategy that was not there before. We have good highways going into Schiphol, those – the ring of Amsterdam, a plan, was of course – it is not good to have a ring. However, it was also part of the Mainport Strategy to make Schiphol more connected to people or goods, which has to go there." (Secretary, VNO-NCW-MBK 2016: 0:14:41)*

[59] Rli describes different "*core economic areas*", where Eindhoven is labeled as "*Brainport*" (Council for the Environment and Infrastructure, 2016a, p. 17].

Spatial planning takes many forms, from the reclaiming of land to the building of ground transport. Within this frame, the relationship with the City of Amsterdam is also pivotal. As Head of Group Strategy & International Development at Schiphol Group states, the mainport policy is not the only key to success; it must be combined with the Metropolitan strategy.

> *"How can you develop aviation of the airports to create maximum benefits to society? There are great benefits, yes, no question, but how to do it well. I think that's also a very interesting perspective on how does this develop in Netherlands, is that the main policy is not only about creating a hub, that's one side I think I used there as well, it's also about a metropolitan strategy. I think that is really a key to success. The Metropolitan strategy. The economic development, social development strategy, the fact that you create, what Amsterdam did, create the point of gravity of the economic development towards the south. Access from south, five minutes by train from here. Created the cargo logistics zone on the south of the airport. It's an integrated policy where the airport is a very prominent stakeholder. It's really a joint effort. How do we as a system optimize the value of air connectivity? How do you grade the access roads and all kinds of facilities to optimize that system, that really has contributed to the success of Schiphol. … Before, airports were in the city. Airports moved out of the city. Now the city is coming to the airports. That you see everywhere. I think cities where the airport is centrally located and there is a good economic and social special planning around the airport and how it's connected to the city." (Head of Group Strategy & International Development at Schiphol Group, Schiphol airport 2016: 1:54:15)*

Combining the forces of a strong city - a point of gravity of economic development - and a strong airport with significant connectivity is key for all parties to be successful. An interesting dimension is the relationship between the City of Amsterdam and the Schiphol Airport. In late 2000, there was a process where the Dutch government and City of Rotterdam were planning to sell their shares of Schiphol Airport, but due to resistance from the City of Amsterdam the sales process was cancelled (Jong, 2012, p. 68).

There can possible by several reasons why privatization of Schiphol Airport meet resistant at the City of Amsterdam. But a fear of a changed view on the mainport strategy to the disadvantages for Amsterdam city could be one reason. As The Head of Group Strategy & International Development at Schiphol Group state, "*They [City of Amsterdam] were concerned about the fact that we [Schiphol Airport] will not serve the interest of the mainport any more [if the airport was privatized]*" *(Head of Group Strategy & International Development at Schiphol Group, Schiphol airport 2016: 1:56:21).*

There is a long tradition of spatial planning in the Netherlands. This is a key factor in relation to development of mainport strategy, since development does require significant spatial planning. Disregarding the general trend of decentralizing spatial planning in the Netherlands, the Dutch government did not include the development of Port of Rotterdam or the Schiphol Airport in this process. Further, the Dutch government defined 13 national interests in 2011, which have renewed the focus on spatial planning around Schiphol Airport. Another important element within this Materialities dimension is the understanding of the positive relation an airport and gravity center, such as City of Amsterdam, can have. This is based on an acknowledgement of the Schiphol Airport as a critical strategic asset in the development of the City of Amsterdam.

7.6.4 KLM

The airline KLM is the traditional flagship carrier of the Netherlands. The airline was founded in 1919 and in 1920, the first flight between Schiphol Airport and London occurred. In 1924, KLM started its first continental flight service to Batavia, now Jakarta, in the former Dutch colony in present-day Indonesia (KLM, 2017). In 1936, a trip to Batavia from Schiphol Airport took five and a half days (Cresswell, 2006, p. 229). An important element is how former colonies and air connectivity are interlinked, as illustrated here.

A key event in the KLM history is the joint venture with Northwest Airlines and KLM, who negotiated a joint venture in 1993. This joint venture came into being due to the open sky agreement between the US and the Netherlands. This bilateral agreement gave KLM an advantage as one of the first to develop open skies agreement with the UK and Japan. In addition, in 2003, KLM and Air France merged to be one of Europe's largest airline groups – how ever this had some political consequence as the Dutch government together agreed on a State Assurances – see also

Besides the international regulations and the merger with Air France, the cooperation between KLM and Schiphol Airport has shaped the development of aeromobilities in the Netherlands. According to the Managing Director, NBTC Holland Marketing, two

crucial elements were necessary in order to cope with the overall development of air traffic: the airline KLM and the Schiphol Airport.

> *"KLM as a home carrier has done a tremendous amount of good for the position of Schiphol and the airline industry in and around Holland in general. I think the whole point is that KLM has such a vast and extensive network throughout the world both in terms of destination traffic but particularly in transfer and transit business makes and facilitates or supports the hub functionality of Schiphol." (Managing director, NBTC Holland Marketing 2016: 0:08:50)*

An interesting point within the organization of KLM, is that their strategy department is called Mainport Strategy, and, as the Vice President explains, "*I am trying to define the right strategic path how KLM should act in order to get our right share at the mainport of Amsterdam*" *(Vice President Mainport Strategy, KLM 2016: 10:40).*

This organization illustrates that KLM, as infrastructure, is interlocked with the Schiphol Airport. Currently as well as historically, KLM is the largest airline in the Schiphol Airport, and its business model is very important for the overall connectivity.

> *"We build a hub system whereby 70% of all traffic is transfer traffic. But for this reason, Amsterdam airport has the size that it currently has because if there is no transfer traffic possible at Schiphol, the airport will decrease in size, but I think it will be 40% of current size." (Vice President Mainport Strategy, KLM 2016: 19:15)*

KLM, the largest airline and essential for the hub of Schiphol, has been shaped by the history of the Netherlands and the state-to-state relations with the UK, the US and Japan. Furthermore, the organization set-up indicates a commitment to the mainport strategy.

7.7 EPILOGUE

The production of aeromobilities in the Netherlands and the making of hub airport in Schiphol Airport is one of the most successful cases in Europe in terms of passenger numbers. The drivers behind this development can be found within dynamic causalities between different Policies and Materialities that are linked to a discourse that I have identified and labeled: *Balanced hub aviation as the engine for society*.

One of the most striking objectives in the aviation system produced in the Netherlands is the *Mainport Strategy*. This strategy was fostered back in the 1980s, as a potential solution to the challenging situation the Netherlands was facing due to the weak

economy linked to the Dutch disease and the growing competition from Germany and France in the common market. The *Mainport Strategy* had and still has a focus on making the Netherlands a key gateway to Europe with the Port of Rotterdam and Schiphol Airport as central actors[60]. In this strategy, aviation began to be viewed as a key engine for the Dutch society. The potential for developing aviation was based on a long tradition in aviation to connect with former colonies in Far East as well as an outward historical trading tradition due to the relatively small domestic economy in contrast to other European countries such as Germany and France. The development of aviation was made possible due to a liberal mindset with a focus on bilateral air service agreements, where the Netherlands had first mover advantages due to the bilateral agreements with the US in 1978 and UK and 1984. The production of aeromobilities also need space in order to facilitate these traffic flows in and around Schiphol Airport. In the Netherlands, there has been a long tradition for spatial planning, which especially can be seen in the construction of the dikes that protect the country from flooding. This tradition supports the political attention and will to support the infrastructure development of Schiphol Airport. As elsewhere in Europe there has been a decentralization process of spatial planning, but in the Netherlands, the government has kept some elements of the spatial development of vital infrastructures including the Schiphol Airport within their premises and responsibility to support the overall competitiveness of the country and in order to "*Create a good quality of life*".

The making of the hub in Schiphol Airport is a vital part of the mainport strategy; this has been articulated in the national strategic documents such as *White Paper on Dutch Aviation* and *Action Program Schiphol Airport* as well in the corporate strategies for Schiphol Airport and KLM. However, there have been different conflicts along the way between KLM and Schiphol Airport, as well as in relation to local inhabitants and growing externalities. In the Netherlands, there has been a long tradition of the consensus decision-making model. The Alders Table and this approach have been used for solving the The Double Objective": the further development of the hub activities in Schiphol Airport while keeping the externalities at a reasonable level. The Alders Table consists of representatives from airlines, airport, local stakeholders and inhabitants as well as representatives from different ministries. The result of Alders Table included a selected policy where only hub-related aviation activities are to be kept at Schiphol Airport while other leisure aviation traffic is to be distributed to regional airports. The recommendations from the Alders Table included a traffic cap

[60] Even though the *Mainport Strategy* still exist, it currently challenged due to the development of Lelystad Airport and the associated increased traffic. As stated in the annual report 2017; the development of the Lelystad Airport as a consequence of Alders Table recommendations have led to some resistance. As the annual report states: "*Politic political and public sentiment around aviation is changing …has the Netherlands fallen out of love with aviation (Royal Schiphol Group, 2018a,* p. 8] – how this develop is still to be see, however it illustrates that development of aviation needs a constant balance between growth and externalities.

to limit the externalities but also a financial program to facilitate sound isolation program for houses that are exposed to noise externalities. Disregarding the different critics of the selective policy by various stakeholders, the recommendations from the Alders Table laid the foundation for the national aviation strategy: *White Paper on Dutch Aviation*. This approach to the making of hub airport in Schiphol Airport can be seen as dynamic causality, since it relates different objects: the making of hub airport, externalities and different stakeholders. In the years after the recommendations from Alders Table, there was established a *Shared Vision committee* to sort out conflicts between KLM and Schiphol Airport. The committee consisted of representatives from KLM, Schiphol Airport and the Dutch government. Hans Alders was chairman of this committee, and the result was an agreement on parts of Schiphol Airport investment plans, a new charge agreement and a common agreement on the importance of the hub function in Schiphol Airport. The latter point did also generate an outcome of the Shared Vision committee stressing that Schiphol Airport international investments should only relate to projects that supports the hub function in Schiphol.

All these Policies and Materialities constitute dynamic causalities that enable the production of aeromobilities and the making of the hub airport in Schiphol Airport. Some of the Policies and Materialities are also present in other cases, such as an outward perspective or consensus-decision based model, but the combination of these objects both in time and space produce this specific kind of aviation. It is no longer possible to copy a first mover advantage, however, the case gives input to my theoretical understanding of the production of aeromobilities which requires political attention, both in terms of financial support but also energy and time.

Based on the political attention and the approach and acceptance from stakeholders to support and develop these objects, which constitute the dynamic causalities, I have - as mentioned above - identified a discourse, which I label: *Balanced hub aviation as the engine for society*. This discourse encapsulates the different aspects of the production of aeromobilities and the making of hub. It is important to stress that there is an acceptance of the duality in aviation both in terms of growth and externalities, but also in relation to potential conflict between stakeholders. In addition, this discourse is also putting the hub function of the Schiphol Airport in the focus as an engine for society related to both economic and social prosperity.

The identified discourse is based on different articulations and practices. The articulations in the mission of Schiphol Airport: "*Connecting the Netherlands: connect to compete and to complete"*, I find it striking since it stresses how aviation is viewed as an engine for society both in terms of business, but also related to the social prosperity that aviation facilitates. The articulation of *The Double Objective* that has a focus on developing aviation and addressing externalities at the same time supports this discourse. The articulation in the *Schiphol Action Programme* stating that the essential for Schiphol Airport to function as hub for transfer passengers further

supports this discourse with its focus on the hub perspective. In addition to these articulations, various practices support this discourse. First, highlighting the Alders Table, as a practice that balances different viewpoints from stakeholders in order to facilitate the making of hub airport in Schiphol, meanwhile addressing the externalities. Further, the practice of Schiphol Airport do not to invest in international projects that don't support the hub function as a practice that supports the societal engine. Lastly, the governance approach to infrastructure development and their commitment in addressing the duality of aviation is a practice that also supports the discourse I have identified.

This discourse and the associated articulations and practices, I will argue is linked to rationalities of a consensus-decision approach to challenging situations as well as a rationality founded in an outward perspective in order to make the relatively geographically small country of the Netherlands even bigger.

The investigation of the production of aeromobilities and the making of hub airport in Schiphol Airport, particularly highlights two elements relevant for my development of a hub airport governance model. First, the fact that the duality of aeromobilities is addressed through a decision-consensus model is vital. This encapsulates the fact that an airport cannot be understood as a stand-alone business but as a part of society, therefore the challenges needs to be addressed through a compromise where all stakeholders give and take in the interest of society. Secondly, in line with this, it is important that the government is active in the strategical dimension of developing aviation since the government or the ministries can by active involvements provide solutions that the industry parties have difficulties in addressing.

These findings are in line with what Jong argued in his PhD. Here he argues for four different rationalities that have formed the development of Schiphol airport: From being a *facilitator of infrastructure*, to be shaped by *environmental issues* and to be considered as key element in *Mainport strategy* and an *airport city* (Jong, 2012, p. 78). The discourse regarding airport cities is not an element founded directly in this chapter, but it could be associated with the fact that Schiphol Airport is part of the metropolitan strategy for the City of Amsterdam, as indicated earlier in this chapter. While Jong is focusing on the development of the airport itself, the focus in this chapter has been a bit wider in terms of my pursuit to understand what makes a hub airport. And in this perspective I would like to add elements of the outward perspective, the long tradition of spatial planning, consensus-decision models and government involvement, as well as the focus from KLM at this Schiphol airport in particular, as it is their main hub airport.

8 CASE – HELSINKI

> *"Finland is an Island, and therefore we need good aviation contact around the world" (General Secretary, Finish aviation union (IAU), 2016: 14:39)*

8.1 PROLOGUE

After the case of Schiphol Airport, I will in this chapter argue for different drives behind the production of aeromobilities and making hub airports by analyzing how aeromobilities are produced in Finland and in particular at the hub airport in Helsinki. My analysis will show that making hub airports is based on dynamic causalities in a nexus of Policies and Materialities and founded on a discourse: "*Finland is an Island*". In addition, I will also highligth some findings related to the production of hub airports here in Helsinki can which can be used to develop my hub airport governance model.

This discourse is supported by a striking articulation such as: "*We think it is a question of life and death: the Helsinki Airport"*. The discourse is also represented in practices and articulations ranging from local political pressure on labor unions and global practices manifested through long-term commitment in building relations to Chinese airports and traffic right negotiations.

The discourse lays out the foundation for a nexus of dynamic causalities between policies and different materialities that among others includes national aviation strategies, foreign policies, location of Finland, development of domestic areas and expansion of Finnair's long-haul fleet. This elaboration of findings illustrates the production of mobilities do not "*just happen[s]*" – as stated by Jensen (see Chapter: 3 Aeromobilities) and is an outcome of different interests among stakeholders with perspectives founded in a local, regional and global understanding (Bloch & Lassen, 2016, p. 1).

It important to stress that most of the material in this chapter is based on the article: "An understanding of how aviation is handled in Helsinki and Finland", which was presented at Danish Transport Conference *Traffic Days* in 2016 at Aalborg University and is published as a proceeding from conference. Despite this chapter drawing on material in the mentioned article, the analytical framework used in this case is developed in relation to the framework presented in the article. However as mentioned in: Information For the Readers, at page: X, I will mark sections or parts that can be related to the article.

In contrast to the previous case regarding Schiphol Airport, I could not identify any published academic articles related to aviation in Finland or in particular related to Helsinki Airport. However, a master thesis from Aalborg University from 2015:

Exploring the multiple roles of a national airline in destination development, analyzes the development of stop-over tourism in Finland in relation to the traffic flow between Europe and Asia (Hämäläinen, 2015). In addition; in relation to the publication of *Finland's Air Transport Strategy 2015-2030*, a background report[61] was published that analyzed the industrial landscape for aviation in Finland (Ministry of Transport and Communication, 2015a; Ministry of Transport and Communication, 2015b).

8.2 COLLECTING DATA

In the spring of 2016, I travelled to Finland to conduct my interviews and collect other forms for empirical material. This was my first field research in relation to this project, where I for the first time tested my interview guide with interviewees.

"Before the field trip to Finland, I managed to set up interviews with representatives from Ministry of Transport and Communication, Helsinki Airport, Finnair, Finnish Hospitality Association, Finland Chamber of Commerce and Cabin Union and the Finnish Aviation Union. Beside interviewing different stakeholders, I also collected different documents, some I had found before the field trip and others were suggested during my interviews. Some of the documents are used directly as a source in this case; others are used as background material. In table Table 8 and Table 9 are my interview persons and documents."[62]

Representing	Interview persons	Company/Organization	Title
Government	Mikael Nyberg	Ministry of Transport and Communications	Director general
Airport	Anonymous	Finavia	Analyst
Finnair	Rikke Munk Christensen	Finnair	Head of Traffic Planning at Finnair
	Lauri Tierala	Finnair	Manager, Market Access and Aeropolitics
Tourism	Tea Taivalkoski	Finnish Hospitality Association MaRa	Legal Counsel
Business	Kaisa Saario	Finland Chamber of Commerce	Advisor
Unions	Anu Hietala	Cabin union (SLSY)	Industrial Relations Officer
Unions	Juha-Matti Koskinen	Finish aviation union (IAU)	General secretary

Table 8: Persons interviewed during my field study in Finland (Bloch & Lassen, 2016, p. 7)

[61] Background report to Finland's Air Transport Strategy 2015-2030: *Lentoliikennestrategian taustaraportti* (own translation based on Google translate from Finish to English)

[62] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: description of interview persons (Bloch & Lassen, 2016, p. 7)

Document	Topic	Type	Year
Airport industry connectivity report	Connectivity	Industry report from ACI	2014
Flying by nature - Global Market Forecast 2007-2026	Passenger forecast	Industry report from Airbus	2007
Aviation connectivity in Europe: the EU and airlines could learn lessons from the Gulf and Turkey	Passenger forecast	Industry report from CAPA	2016
Annual review/report 2007, 2009,2015	Company review	Company report - Finnair	2007,2009, 2015
Finland's Air Transport Strategy 2015-2030	Strategy	Ministry report	2015
Lentoliikennestrategian taustaraportti - background report to Finland's air transport Strategy 2015-2030	Strategy	Ministry report	2015
Finland's China action plan	Strategy	Ministry report	2010

Table 9: Documents used for analyzing aeromobilities in Finland (Bloch & Lassen, 2016, p. 7)

8.3 HISTORY OF HELSINKI AIRPORT

In this chapter, I will begin with a historical brief of developing Helsinki Airport, before I analyzed the traffic development in Helsinki Airport.

Helsinki Airport is located just over 15 km north of the city of Helsinki. The inauguration of the airport took place in 1952, when Finland was host for the summer Olympic Games. The new airport was a replacement of the older Malmi airport just 12 km northeast of the city of Helsinki. The new airport was constructed since the old airport could not handle the growing number of passengers and the new heavier aircraft. Initially, there was only one runway with a length of 2km. In 1956 a second runway was constructed and finally in a third runway was constructed in 2002 – all runways are today approximately 3km. In 1963, a new passenger terminal was constructed and this was later in 1983 expanded. Throughout 1993 to 1999, the airport expanded with a new domestic, international terminal including a shopping area, hotel and congress center and arrival and departure halls. Again in 2004 and 2009 an expansion of International terminal with a shopping center and spa. Finally, in 2013, an extensive expansion plan was

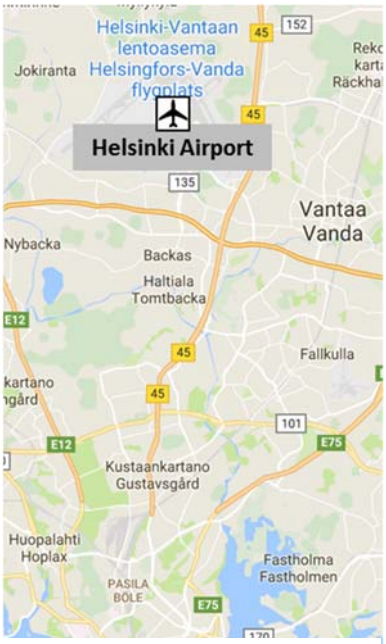

Figure 17: Helsinki Airport located just over 16 km from city of Helsinki (Google Map, 2018g)

launched including expansion of terminal for long-haul traffic, new arrivals and departure hall and baggage facilities (Finavia, 2016c; Finavia, 2016d; Finavia, 2016e). In the forthcoming chapters, I will argue that this current and future accepted expansion plan is linked to the discourse where Finland is understood as an Island.

8.4 HELSINKI CONNECTIVITY

"In the paragraph below, I will unfold the development of traffic within Finland. In 2017, in total there were 22.7 million passengers arriving and departing from the 21 active operating airports in Finland. The state-owned corporation: Finavia operates and owns these 21 airports across Finland (including Helsinki Airport), where 19 are airports with scheduled traffic. The other 2 airports are military airports and/or airports for general aviation traffic ((Finavia, 2018a); Analyst, Finavia interview 2016: 13:48). There are multiple smaller airfields scattered around (Bloch & Lassen, 2016, p. 8). Helsinki Airport, with the other 21 airports are organized as a network of airports. This implies that airports with financial deficit are allowed to be cross-subsidized by other airports in the network. Currently, Helsinki Airport is the only profitable airport out of the 22 airports, which makes Helsinki Airport a key financial driver for financing the entire national network of airports (Ministry of Transport and Communication 2015:2) (Bloch & Lassen, 2016, p. 9)."[63]

In addition to this and coming elaboration of the traffic and connectivity development - see Appendix D. Case of Helsinki Airport, for graphical presentation of major traffic trends.

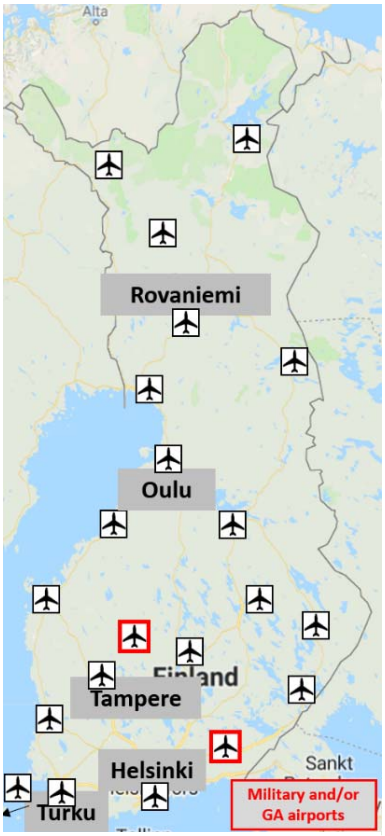

Figure 18: 21 airports in Finland owned by Finnavia; 19 with scheduled traffic and 2 military/GA (Finavia, 2018a; Google Map, 2018c)

[63] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: texts parts and 2008-2017 realized numbers (Bloch & Lassen, 2016, p. 8-9)

"Helsinki Airport is by far the largest airport in Finland based on scheduled departing seats in 2017, it has 11.8m departing seats (81% of total seats). Oulu airport in mid-Finland has 0,6m departing seats (4% of total seats), while the airports Rovaniemi, Tampere, and Turku have approximately 2% of the seat[64] (SRS seat data). Over the last 10 years (2008-2017) there has been a total traffic growth in Finland of 1.3% (CAGR). While international traffic has increased by an average of 3.0% (CAGR), the domestic traffic has decreased by 1.7% (CAGR) over the 10 years. In Finland in 2017, 83% of total traffic was international and 17% was domestic (SRS seat data)."[65]

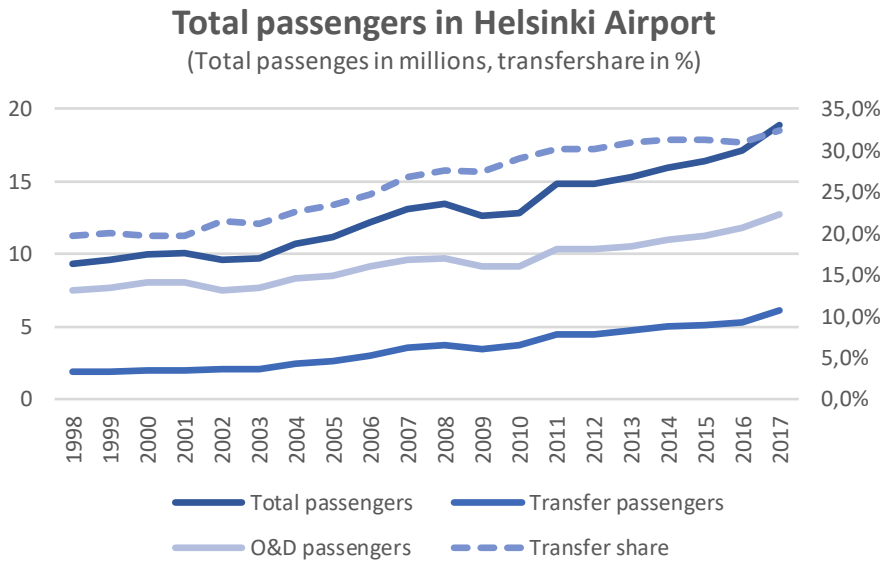

Figure 19: The traffic in Helsinki airport have increased by 3.9% from 2008-2017, this growth have been associated with a significant growth in transfer traffic (Finavia, 2018b)

"Largest carries carrier in Helsinki Airport is Finnair with 87% of all departing seats, then Norwegian with 13% and SAS with 4.6%. In the Oulu Airport, Finnair has 59% and Norwegian 39%, while in Rovaniemi Airport, Finnair has 70% and Norwegian

[64] In comparison with the Danish aviation market (2017): Total departing seats: Copenhagen Airport: 18.3m, Billund Airport: 1.6mand Aalborg Airport: 1.0 m (SRS seat data)

[65] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: texts parts and 2008 and 2017 realized numbers (Bloch & Lassen, 2016, p. 8).

provides 25% of all departing seats (SRS seat data). This distribution illustrates the important of Finnair for the connectivity in Finland"[66]

"Helsinki Airport had in 2017 18.9 million passengers and thereof 6.1 million transfer passengers, and therefore a transfer share of 32%. Helsinki Airport has, over a 10-year period from 2008 to 2017, had an average growth rate of 3.9% (CAGR) in total passengers and in transfer passenger the growth has been 5.7% (CAGR) the number of transfer passengers The transfer ratio has increased by 4.9%-p from 27.6% to 32.5% (Finavia, 2018b). Helsinki Airport has two primary functions, it functions as a hub airport between Europe and Asia and it is a vital gateway for domestic air traffic."[67]

"The main carrier at Helsinki Airport is Finnair, which uses Helsinki Airport as its main hub. Finnair is by far the largest airline in Helsinki Airport with 68% of all departing seat capacity (SRS seat data)[68] and 87% of all transfer passengers (MIDT data). The second largest airline operating at Helsinki Airport is Norwegian, with 13% of all departing seat capacity, while SAS has 4.6% of all departing seat capacity and Lufthansa has 3.4% all departing seat capacity (SRS seat data). The top 5 international destinations countries in 2017 from Helsinki were Sweden, Germany, UK, Spain and Denmark, these destinations constituted 32% of departing seats (SRS seat data). Domestic destinations served from Helsinki Airport constitutes 30%, while international is 70%, based on seat capacity. Of the international traffic, where constitutes Europe 59%, while long-haul – outside of Europe – makes up 11%. Of this 11 %, the Asian market has a share of 79% (SRS seat data). The passenger transferring at Helsinki Airport, have different origins and destinations. In 2017, 38% of the transfer passengers did travel from Europe via Helsinki Airport to Europe, while the residual was between long-haul destinations and Europe (MIDT data)[69]. Of the

[66] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: texts parts and 2008 and 2017 realized numbers (Bloch & Lassen, 2016, p. 9).

[67] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: texts parts and 2008 and 2017 realized numbers (Bloch & Lassen, 2016, p. 8).

[68] As stated previously: The data source (SRS seat data) is based on number of departing seats and not passengers. The passenger ratios listed here will therefore only be a proxy due to the different load factors of different airlines.

[69] The split of transfer traffic into transfer traffic between Europe/Europe and Europe/long-haul destinations are based on origin and final destinations. By this, e.g. if a 2nd transfer is taking place at another European airport for travel to US, the transfer in Helsinki Airport is labelled as a Europe/long-haul destinations transfer. Even though the first airport after Helsinki is European. This potential mis-interpretation may only relate to flight paths with more than one transfer airport. In the case of Helsinki Airport (2017), 14% of all transfer traffic did transfer at another airport before or after Helsinki airport (MIDT data).

transfer passengers traveling Europe to Europe, 59% of those are traveling Domestic Finland via Helsinki to Europe (MIDT data)."[70]

By an assessment of the connectivity in Helsinki from the NetScan model; the total *Airport connectivity* has from 2008-2017 increased by 7%, where the *Direct connectivity* development is -5.5% and the *Indirect connectivity* is 14%. In contrast, the *Hub connectivity* has increased by 50%. The decrease in *Direct connectivity* is due to lower number of frequencies in 3rd week of June from Helsinki Airport – (see: 5.3 Data Within an Open System) – however an increase in seats per aircraft (SRS seat data) and a potential higher load factor can explain the decreased in *Direct connectivity* in contrast to the overall increased in number of passengers in Helsinki Airport. Even though the *Direct connectivity* has decrease, the hub function has been increased significant (ACI Europe, 2014; ACI Europe, 2015a; ACI Europe, 2016; ACI Europe, 2017a).

"A striking growth is seen in relation to long-haul traffic to and from Asia. From 2005 to 2015, the level of annually departing seats from Helsinki Airport towards China and Japan has increased by more than 331,000 (SRS seat data). In the same period, annually departing seats from Copenhagen Airport have decreased by more than 22,000 while Stockholm airport (Arlanda) has had an increase of less than 49,000 departing seats. Oslo airport has not attracted any routes to Asia and Warsaw Chopin Airport only increased the annually departing seats from zero to 38,000. In the light of this comparison between main airports in the North and North-eastern part of Europe, Helsinki Airport has attracted a significant part of this traffic flow between Europe and Asia (Bloch & Lassen, 2016, p. 6).

[70] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: texts parts and 2008 and 2017 realized numbers (Bloch & Lassen, 2016, p. 8).

Within the period of (2005-2015) Helsinki Airport has increased its capacity to China and Japan by 127% − in comparison e.g. Germany has only increased by 61%; France 24%; the UK: −9% and the Netherlands: 45%."[71]

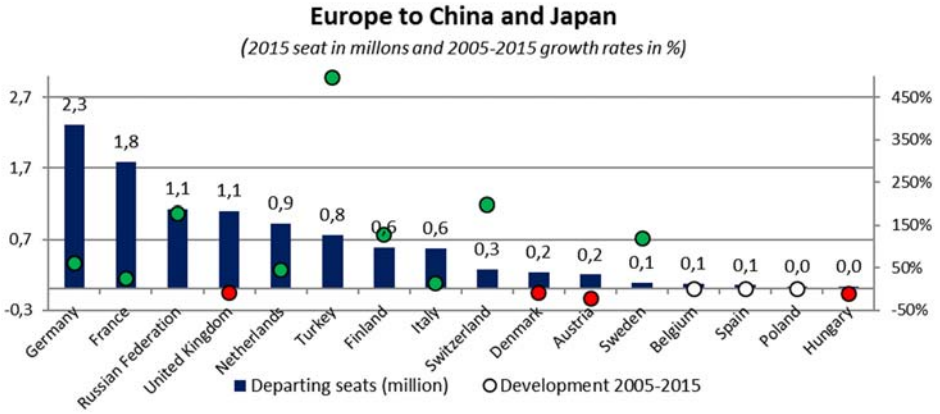

Figure 20: Development in seats from European countries to China and Japan in 2015 and 2005-2015 development (SRS seat data), (Bloch & Lassen, 2016, p. 9)

8.5 THE POLICIES DIMENSION

In line with my theoretical framework (see Chapter: 6 Understanding Airports Through Governance: Policies and Materialities) I will divide the analysis into two dimensions – a policies dimension and a materialities dimension. The two dimensions are separated for analytical reasons to understand the dynamic causalities and discourse for the production aeromobilities and making of the hub airport in Helsinki.

"In spring 2015, the Ministry of Transport and Communication published *Finland's Air Transport Strategy 2015-2030*. The report was written based on an initial analysis with inputs from various stakeholders such as '*companies, local and central chamber of commerce, municipalities' authorities, and other ministries*' (Director, Ministry of Transport and Communication 2016: 30:39). The overall air transport vision acknowledges air transport as an important factor for the country's economy, future development, and competitiveness (Ministry of Transport and Communication 2015: 4). In line with this, the strategy points out that the two main drivers behind this vision

[71] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 6)

are the hub function of Helsinki Airport and developing regional airports (Ministry of Transport and Communication, 2015b, p. 6)"[72]

"Concerning the hub function in Helsinki Airport, there are primarily two issues: the externalities due to the expansion and the cost of expansion. Elsewhere in Europe, expansion, and externalities such as noise and land use are generating protests among local residents and politicians (Watkinson, 2015). In Finland, Director General, Ministry of Transport and Communication gives another perspective. He states that the expansion of the airport is a matter of life and death:

> *"We think it is a question of life and death: the Helsinki Airport – all local issues must consider the expansion of the airport to get more passengers and more shops. I think the local government has to take care of the importance of Helsinki Airport"* (Director General, Ministry of Transport and Communication 2016 20:50)"[73]

The articulation, that: "*it is a question of life and death*" how the expansion of Helsinki Airport is handled is a strong articulation and is a representation of how aviation is thought of as in the political system. Even though this articulation might not be an expression everybody in the political system would relate to, it is still a strong articulation from a representative from the Ministry of Transport and Communication, which have published the aviation strategy: *Finland's Air Transport Strategy 2015-2030*.

"Such a strong articulation can well represent a motivation for the political will and practise to accept a significant expansion plan for Helsinki Airport. The Director General, Ministry of Transport and Communication, states, it is important to strengthen the hub function of Helsinki Airport, including increasing the capacity from 16 million yearly passengers to 23 million in 2030 (Ministry of Transport and Communication, 2015b) [p. 2). This expansion requires significant investments both in airport terminal expansion and in transport infrastructure to and from the airport. As part of the expansion, a new train connection from Helsinki to the airport opened in 2015 (Finavia, 2016a); an investment of approx. EUR 1bn paid by the government (Analyst, Finavia 2016: 59:20). Finavia is planning to invest EUR 1bn in airport terminal expansions (Analyst, Finavia 2016: 43:29). To start the new expansion, the government is financing the airport with EUR 200m (Analyst, Finavia 2016: 47:55) The plan is to expand the terminals by 75,000 m^2, double the bridge-served stands

[72] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: small formulations – but main parts comes from the article (Bloch & Lassen, 2016, p. 10).
[73] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: small formulations – but main parts comes from the article (Bloch & Lassen, 2016, p. 13).

from 8 to 16 and increase baggage facility capacity by 50% (Finavia, 2016f) (Bloch & Lassen, 2016, p. 13)"[74]

8.5.1 TRAFFIC RIGHTS

"To fulfil the long-haul Asian strategy – as I will elaborate on in the Materialities dimension – of Finnair, traffic rights are important. Traffic rights can be bilateral agreements between two states – multilateral if over two states are involved – in relation to commercial air transport (Gidwitz, 1980, p. 135). The bilateral agreements can relate to the kind of service; scheduled, charter or cargo, and the agreement allow airlines to fly to a given airport or over a given territory (Gidwitz, 1980, p. 135) (see section: 2.2 Development Within the European Aviation Market). As stated in section: 2.2, open sky agreements have been negotiated to remove different forms for restrictions, but this does not apply to all parts of the world. Consequently, Finland must Finland must negotiate traffic rights with Russia, China and most of the Asian countries in order to land or fly over their territories. Therefore, a good relationship with Russia and China is important, as stated:

> *"The ministry of transportation handles the negotiations or sets the meetings with the Russians – they did it last time in the beginning of March. You need to do it all the time or at least annually"* (Analyst, Finavia 2016: 40:40)"[75]

"The Head of Traffic Planning, Finnair, and Analyst, Finavia states that Finland actually has a comparative advantage compared to other European airlines in relation to traffic rights in Russia since Finland and Russia are neighbours:

> *"In relation Russia, we are neighbours – there is another relationship, Denmark also have another relation to Germany." [Translated from Danish] (Head of Traffic Planning, Finnair 2016: 46:56)*

> *"Finland is a good neighbor for Russia and we have managed to negotiate enough of those overflight rights – that is crucial for the*

[74] This is paragraph is copied from the article "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 13)

[75] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: text part related to open sky agreements (Bloch & Lassen, 2016, p. 14).

> *whole business… For many other countries it is not so easy to negotiated with the Russian" (Analyst, Finavia 2016: 36:54)"*[76]

"It is not always easy to negotiate traffic rights and, in this sense, Finland does not have that much to offer in relation to other European countries since its local market is not very strong. In this context, it is accepted that development and negotiation of traffic rights require a long-time horizon. Manager, Market Access and Aeropolitics, Finnair states:

> *"[In] all of Asia except Japan [you need to negotiate traffic rights], so it a risk and it is a challenge. It kind of forces you to think really long term and advance step by step and then of course … The point to point interest in Helsinki is quite limited, so to get traffic rights we always need to work quite a bit and have the support of local airports or local administrators – that is one option. Another option is working together with another carrier in that country. Another is having very high political support" (Manager, Market Access and Aeropolitics, Finnair 2016: 34:08) (Bloch & Lassen, 2016, p. 14)"*[77]

"Since Finland is not a very attractive point-to-point market, the development and negotiation of traffic rights are a long ongoing practice that requires time. Sometimes the development of traffic rights requires the development of relationships with other airlines, airports, or local and national politicians. An example of such a practice is the establishment of the 'Sister Airport Relationship' with Capital Airports Holding Company in China, which is the largest airport operator in China with more than 40 airports in China (Finavia, 2016b). These two practises with traffic negotiation and building relations to other airports in order to promote aviation can be seen as an element that supports the discourse of how important aviation is for the Finnish society."[78]

"Another practice that supports the discourse of the importance of aviation is illustrated in relation to pressuring cabin crew at Finnair. The political attention towards a promotion of Finnair can be seen in the approach or practise in relation to the optimizing of Finnair – as I will return to this optimization of Finnair in the section 8.6 The Materialities Dimension. One of the core issues in the turnaround for Finnair was a cost reduction including a potential outsourcing of cabin crew. After a long period of negotiations, the solution was that outsourcing was put to a hold for a period and it was agreed that on e.g. some Asian flights, there should be some Asian crew.

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[76] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 14).
[77] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 14).
[78] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 14)

Industrial Relations Officer, Cabin union (SLSY) thinks there were hard negotiations with Finnair because the politician was not always on the cabin crew's side, as she states it:

> *"Most of the politicians think Finnair is very important for the economy so they are willing to sacrifice the cabin crew" (Industrial Relations Officer, Cabin union (SLSY) 2016 19:12)"*[79]

Developing Finnair is to some extent depending on the political attitude towards the company. As this paragraph illustrates, that Finnair is within the political system recognized, as one of the key drivers for the production of aeromobilities in Finland. The statement from the Industrial Relations Officer, Cabin union (SLSY), articulates the political support to Finnair. This practice is related to a discourse that place aviation also has local conflicts that need to be addressed and therefore the production of aeromobilities is a matter of local and global events and relations.

An interesting perspective that can support the discourse related to the importance of aviation in Finland.

As I will argue for here is that even there is articulations and practices that indicated a discourse of the importance of aviation, I will argue that when aviation itself solve an actual problem the different associated cost to aviation is much easier to counter balance in the political system. As Manager, Market Access and Aeropolitics, Finnair states that most politicians understand that domestic air traffic and long-haul traffic together solve a problem with coherence within Finland and in relation to Europe. This articulation supports the discourse that *Finland is an Island*:

> *"Finland is a country of long domestic distances, the cities and counties need domestic travel. [Politicians] are aware that many of the domestic routes will not make profit, even if it was a low cost carrier that did operate them. The only way of keeping [the domestic] routes alive is if it is part of a wider network airline and brings network value. And the only way of doing that is if Finnair has a long-haul strategy. So I think members of parliament have acknowledged that the Asian strategy is a risk, but it is probably the only way anybody could see Finnair as an independent airline in the future –*

[79] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: The initial part in this paragraph is elaboration, however from the words: "One cost" and the rest of this paragraph is directly copy from the article (Bloch & Lassen, 2016, p. 12).

> *and as a result be able to serve the domestic market" (Manager, Market Access and Aeropolitics, Finnair 2016 27:14)*[80]

This challenge with coherence is associated with the narrative stating: *Finland is an Island* – as Manager, Market Access, and Aeropolitics, Finnair elaborates:

> *"[In the] political world where big narratives always have the power… one is 'Finland is an Island', if you look at the map it is true, the long Russian border and then the Baltic sea. It is in the psyche of every Finn, in order to go to other parts of the world you either take a ship or plane, which obviously raises the importance of international ports and airports" (Manager, Market Access and Aeropolitics, Finnair 2016: 9:34)*[81]

This articulation: "*Finland is an Island*" is also recognized by other interviewed persons:

> *"We have realized that in many aspect of transport we are sort of an Island" (Advisor, Finland Chamber of Commerce 2016: 12:02)*

> *"Finland is an Island, and therefore we need good aviation contact around the world" (General Secretary, Finish aviation union (IAU), 2016: 14:39)*

This section analysing the policies related to how aeromobilities and the hub function in Helsinki are produced indicates various objectives that constitute the dynamic causalities along the practices and articulations that supports the discourse related to "*Finland is an Island*". Policies elements such as Finnair's Asian strategy and *Finland's Air Transport Strategy 2015-2030* along the political attention towards traffic right negotiation are elements that need to be understood in order to understand the making of hub airports in Helsinki. Next, I will analyse the Materialities dimension to further understand the production of aeromobilities.

8.6 THE MATERIALITIES DIMENSION

After having analyzed the drivers behind the production of aeromobilities from a policies point of view. I will analyze the materialities dimension and in order to

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[80] This is quote is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 12).

[81] This is quote is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 13).

understand dynamic causalities that support my arguments for a discourse: "*Finland is an Island*" that relates to aviation is a vital driver for the Finnish society. Now I will unfold some of the materialities that make aeromobilites possible. I will address the geographical location of Finland, the turnaround and the expansion of Finnair and lastly the relation and functions of the regional airports in Finland.

8.6.1 LOCATION OF HELSINKI AIRPORT

An important materiality that needs to be taken into consideration in order to facilitate the production of aeromobilities is the geographical location of Finland. As Legal Counsel, Finnish Hospitality Association MaRa, states:

> *"Finland is quite in the middle between Asia and Europe. Helsinki is located quite well in the middle". (Legal Counsel, Finnish Hospitality Association MaRa 2016: 16:10)*

This location is mentioned as a key materiality for success, as traffic from Europe to Asia has a natural path over Helsinki Airport. Beside the natural location for traffic from Europe to Asia, the Finish export has also had a long tradition focusing on the Asian market – and especially the Chinese market.

> "*Finland lives off export. With rather small domestic market domestic demand and a tradition of quite strong industrial companies, who have been exporting – not so much consumer goods – but industrial products which both leads to the general understanding and the possibility. International trade is what keeps the country alive" (Manager, Market Access and Aeropolitics, Finnair 2016: 9:34)*

Manager, Market Access and Aeropolitics, Finnair continues by stating that Finland has had a long-term focus on the Chinese market:

> "*Finish companies saw quite early on that China is going to be the next big thing. And among Europeans countries several large Finnish companies were the first to really invest in China and begin the long term present in China. Companies as Kone*[82] *for example, so the China strategy has been some kind of a national project but I would not say it began by the government – not solely, but more runned by Finnish business*" (Manager, Market Access and Aeropolitics, Finnair 2016: 21:09)

[82] Kone is a key manufacture within elevator and escalator industry (Kone, 2017)

The location of Helsinki Airport enables a logical focus on the Chinese market. This is an example of how a materiality enables a practice; in this case the historical focus of the traffic between Europe and Asia. Below is an illustration of the Helsinki location between Europe and Asia. In relation to the location of Helsinki Airport travelers have the advantages because almost no European market must travel 'backward' in order to use Helsinki Airport as a hub to the northern part of Asia. In contrast, an example: London Heathrow, most Europeans have to travel 'backward' - towards the west to use Heathrow as a connecting hub to Asia.

Figure 21: Helsinki Airport has a natural location - especially as a hub between Europe and Northeast Asia (Finnair, 2008b), (Bloch & Lassen, 2016, p. 14).

"As highlighted so far in this chapter, the production of aeromobilities in Finland are linked to a strong discourse combined with an expansion of Helsinki Airport, development of traffic rights and a geographical location. But as Director General, Ministry of Transport and Communication the expansion of Finnair is also important:

> *"The success story is pretty much with our location between Asia and Europe and Finnair and Finavia how they play this game together …; especially Finnair with the long-haul capacity and I think also they have been able to negotiate with Russia, Japan and China relatively well to have the traffic rights they need, they have modernized their fleet and we have been able to expand Helsinki Airport. So I think there are a lot of small issues that have come together (Director General, Ministry of Transport and Communication 2016: 9:43)"*[83]

[83] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated

8.6.2 FINNAIR DEVELOPMENT

Finnair is a key materiality in producing aeromobilities in Finland and making the hub in Helsinki Airport. I will argue that despite challenging times, Finnair has maintained their strategic plan focusing on long-haul traffic to Asia. As stated in the policies dimension, this required difficult times for cabin crews and as illustrated below significant investments in new aircraft. This development of materialities is easier with political goodwill.

"Finnair is the main airline in Helsinki Airport with 68% of total traffic (SRS seat data). After some challenging years around 2011, where restructuring and cost savings was needed to generate a turnover (Finnair, 2016b); Finnair has now changed the situation from years with a financial deficit to growth and profit, as Manager, Market Access and Aeropolitics from Finnair states:"[84]

> "*[In Finnair] we have not being growing for the last 3-5 years. But now we are in the growth phase, last year was the first year in quite a long time where we actual made a profit". (Manager, Market Access and Aeropolitics, Finnair 2016: 23:55)*

The Finnair strategy is to connect Europe with Asia, as stated in annual report 2015: *"The cornerstone of Finnair's strategy is leveraging its geographical competitive advantage and the fastest connections in the growing market of air traffic between Asia and Europe."* (Finnair, 2005, p. 12)

This strategy is not new, since Finnair has been flying to Asia for more than 30 years[85]. Manager, Market Access and Aeropolitics, Finnair states:

> *Finnair have had a long tradition in Asia, we were the first airline to launch a direct flight to Tokyo in 1983. We were the only European carrier that kept flying to China even after Tiananmen Square, so it has been very long-term commitment of using the geographical location and obviously there are links to the Asian and Chinese economies as more Chinese passengers coming into Europe and*

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with: The quote here is directly copy from the article, however the context is rewritten (Bloch & Lassen, 2016, p. 10).

[84] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: Most of text is copy from the article, however it is framed in another context (Bloch & Lassen, 2016, p. 11).

[85] To support that the Asian strategy is not new: In 2004: The former CEO and President of Finnair: Keijo Suila states in an interview: "*I look at the future of Finnair … we will see a continuously enhanced European network and future expanding growth in Asia, Baltics and Scandinavia*" See: http://www.globaltravelerusa.com/keijo-suila-finnair-president-and-ceo/.

> *more European passengers going to China. The Asia strategy was built on Japan, but now it has two very strong poles – both China and Japan (Manager, Market Access and Aeropolitics, Finnair 2016 12:16)*[86]

"This focus on Asia is stressed by the Head of Traffic Planning, Finnair:

> *I have never experienced an airline with such a clear strategy where the airlines are so loyal to it (Head of Traffic Planning, Finnair 2016 13:51)"*[87]

Due to the long-term strategic focus, Finnair, in 2007, ordered 11 new A350-900 long-haul aircraft (Finnair, 2008a, p. 11). In the 2007 version of the Airbus industry report: *Global Market Forecast 2007-2026,* Airbus forecast from 2007 to 2016 an increase of 5.9% RPK[88] between Europe and Asia-Pacific (Airbus Inc., 2007, p. 90). In 2009 and 2010, the European airline industry had severe challenges due to the financial crisis; despite these difficulties, Finnair did not change its long-term focus and continued investing in new A350-900 aircrafts[89]

"As stated in Finnair 'Annual review 2009' at the height of the financial crises: '*Finnair holds several trump cards, which won't lose their value even when the company encounters the severest turbulence*' (Finnair, 2010, p. 17) and the Asia strategy is listed as a key focus area[90]"[91].

[86] This is quote is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 11).

[87] This is quote is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 11)

[88] RPK: Revenue Passenger Kilometer

[89] An A350-900 aircraft is a significant investment of EUR 305m per aircraft (Airbus Inc., 2016) - This is the official list price in 2016. Depending on configuration, engines, number of purchase etc. the price will vary.

[90] In the annual review 2009: Key areas for Finnavia are labelled "*Trump cards*" (Finnair, 2010, p. 17).

[91] This is quote is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 11).

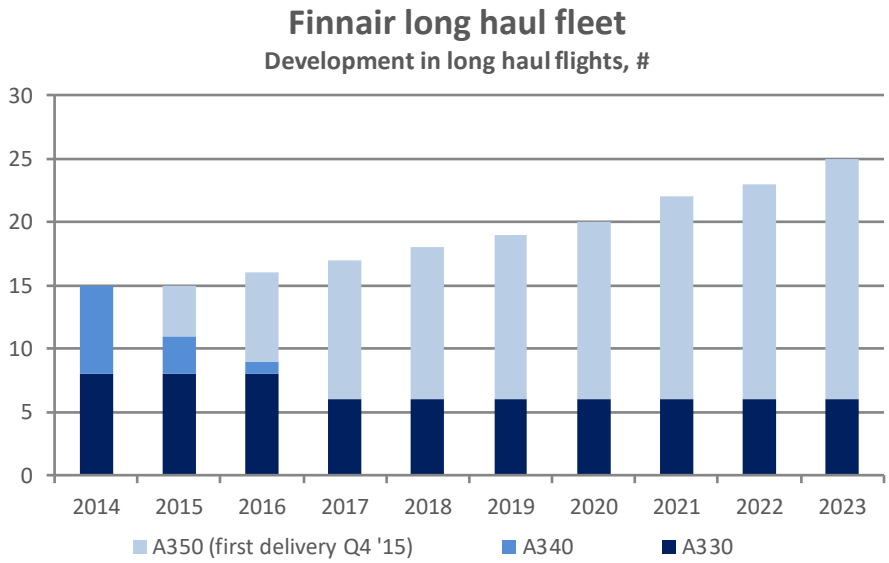

Figure 22: Finnair has ordered 19 new A350 long-haul aircraft. The first A350 operated from late 2015 while the last A350 will be delivered in 2023. (Finnair, 2016a, p. 15) (Bloch & Lassen, 2016, p. 14).

"The first new aircraft A350-900 was delivered in late 2015 and in 2023 all of the 19 new aircraft will be in operation. The current plan is to phase out the existing A340 aircraft and in 2020 Finnair will have 20 long-haul aircraft (Finnair, 2016a, p. 15)"[92]

"In the turbulent times for Finnair, the political understanding and support are important as a driver for the production of aeromobilities and making a hub airport in Helsinki, as Industrial Relations Officer, Cabin union (SLSY) states"[93]:

> *"The politician have bought the Finnair Asian strategy so long ago and they have put so much into that strategy so everybody wants to believe in it. It has been the way that have been chosen … the whole airport was built for the Asian strategy. Finnair was very good in selling the idea since it is easy to explain" (Industrial Relations Officer, Cabin Union (SLSY) 2016: 22:42)*

[92] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 11).

[93] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: Most of this is direct quote, but in another context (Bloch & Lassen, 2016, p.12).

8.6.3 REGIONAL AIRPORTS

"Besides the materialities of Helsinki Airport as a hub and Finnair, the regional airports are important materialities and drivers in the production of aeromobilities in Finland. First of all they provide feeder traffic for the hub function in Helsinki Airport, however the regional airports do also have different functions compared to Helsinki Airport. One additional function − due to the long distances in Finland, there being more than 1,000 km between the south and the north of Finland – of regional airports is to generate the possibility for increasing mobility and therefore coherence in Finland. Another function of the regional airports is to provide the possibility of providing a feed to international traffic in Helsinki and also to develop tourism (Hämäläinen, 2015, p. 50)"[94]

"It is a challenge that all regional airports are making financial losses. Depending who you ask, the yearly loss form the regional airports range from EUR 20-40m (Director General, Ministry of Transport and Communication 2016: 30:39; 53:01) (Analyst, Finavia 2016: 1:12:25). Due to a network principle, the deficit of the regional airports is covered by Helsinki Airport. The Director General, Ministry of Transport and Communication, sees the air transport network as a balance between the regional airports and the development of Helsinki Airport (Director General, Ministry of Transport and Communication 2016: 10:47)."[95]

"To solve the situation, the Ministry of Transport and Communication would have liked to rethink the entire transport network by using more land transport, such as rail and road, over small and medium long distances and then potentially close some of the regional airports to have more focus on Helsinki Airport (Director General, Ministry of Transport and Communication 2016 25:28)."[96]

"It makes sense for the Ministry of Transport and Communication to have this cost focus in relation to regional airports due to their ownership of these airports, but local stakeholders are to some extent against the shutdown of the regional airports. Despite the intentions of the Ministry of Transport and Communication to close some of the regional airports, the process is not straightforward:

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[94] This paragraph draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: Most of this direct quote, but new text parts have been added (Bloch & Lassen, 2016, p.15).

[95] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 15).

[96] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 15).

> *"From the [regional] areas perspective, they are very dependent on the airports, so we sometimes have the political discussion if we should get rid of some of the airports in order to lighten the burden of Helsinki Vantaa, but we have not been very successful" (Director General, Ministry of Transport and Communication 2016 11:34).*"[97]

"In contrast, Finnair does not fully agree with the Ministry of Transport and Communication regarding the potential shutdown of regional airports. Finnair does acknowledge that domestic routes might not be financially sound looking at the point-to-point market, but this perspective is too narrow as network effects have to be included in order to evaluate the profitability. Finnair evaluates a domestic route as profitable if there are more than 100.000 pax a year, while Finnavia has a threshold of 300.000 pax per year according to interview person from Finair (Manager, Market Access and Aeropolitics, Finnair 2016: 29:49)."[98]

"The outcome of *Finland's Air Transport Strategy 2015-2030* did not state that some of the regional airports were to be closed[99] in the future despite the Ministry of Transport and Communication's willingness to do so. Instead, it was agreed to establish 5 working groups focusing on: "*the demand and the tourism and how they could have more passenger [in the local areas)*" (Director General, Ministry of Transport and Communication 2016 35:47)"[100]

"Analyst, Finavia was also slightly disappointed: "*To put it bluntly, the outcome was that: they did not dare to define a number of how many airports we need*" (*Analyst, Finavia* 13:48). In the same way, the Director General, Ministry of Transport and Communication is not very content with the result: "*I'm not angry - but slightly upset that in our business … no one is ready to make an effort and so this has been also in this airport discussion very frustration sometimes*" (Director General, Ministry of Transport and Communication 2016 43:06)."[101]

"Regarding the development of the aviation network in Finland, one issue is the development or shutdown of regional airports. Out of the 18 regional airports owned

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[97] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 15).

[98] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 15).

[99] Finnavia did in 2015 sell of one regional airport: Lappeenranta in the Southeast of Finland to the local municipality See: https://www.finavia.fi/en/newsroom/2015/lappeenranta-airport-acquired-new-company

[100] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 15).

[101] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 16).

by Finavia with regular passenger traffic based on 2015 passenger numbers, 9 have less than 100,000 passengers per year, and 14 have less than 300,000 pax per year – see: Figure 23"[102]

Figure 23: Regional airports in Finland with commercial or scheduled passenger traffic (Finavia 2016b). Due to different perspectives, Finavia and Finnair have different thresholds regarding when a regional airport is profitable. (Bloch & Lassen, 2016, p. 16)

"Even though Finavia has sold one airport and closed another between 2015 and 2016[103], the regional airports are still a financial burden for the entire aviation network. However, due to the local residents, political attention, and the network value estimation from Finnair, no more airports have been sold or closed. In order to understand the production of aeromobilities, it is important to be aware of the link to

[102] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 16).
[103] Finnavia did in 2015 sell of one regional airport: Lappeenranta in the Southeast of Finland to the local municipality and close: Varkaus airport in the central Finland. See: https://www.finavia.fi/en/newsroom/2015/websites-lappeenranta-and-varkaus-airports-will-be-closed-31-december-2015.

domestic regional airports as a materiality for development of Helsinki Airport as a hub."[104]

The focus on a regional airport as a materiality constitutes an objective in a system of production of aeromobilities that are a product of different dynamic causalities.

8.7 EPILOGUE

"In this chapter, I have unfolded different drivers behind the production of aeromobilities in Finland and making hub airports in Helsinki and I have argued for a discourse: "*Finland is an Island*", through different articulations and practices, this discourse is based on different rationalities about the geographical location and the historical political situation.

The dynamic causalities in making a hub airport in Helsinki relates to several objects. The political understanding of the link between domestic coherence, the long distance to Europa and the Asian strategy for Finnair that motivates for a political willingness and attention to invests in the infrastructure at Helsinki Airport. This has to be understood in relation to the fact that Helsinki Airport is the only airport within the Finish airport network system that is profitable and therefore it is possible to financially cross-subsidize the regional airports and thereby support the possibility to maintain the foundation for domestic coherence. The focus on the Asian strategy by Finnair is not a new strategy; it is argued that the strategy is over 30 years old. To fulfil this strategy, traffic right negotiation with the neighbouring Russia is important. In addition, the strategy is dependent on the hub in Helsinki to connect the European, Domestic and Asia traffic. This illustrates that making the hub airport in Helsinki does not only need a strong airline but also political awareness and understanding of the dynamics between the Asian strategy and the Domestic and European connections. I will, therefore, argue that this understanding motivates political willingness to invest in landside and airside infrastructure including engagement in international negotiation.

These intertwined dynamic causalities behind making a hub airport in Helsinki is founded on a discourse among stakeholders: "*Finland is an Island*". This discourse is encapsulated in various articulations and practices since this discourse motivates for political attention towards developing aviation and particularly the making of Helsinki hub airport. Among others; the articulation related to developing Helsinki Airport is a matter of life and death and the articulation concerning the willingness for the politicians to "*sacrifice*" the cabin crews of Finnair underpins this discourse. In

[104] This is paragraph is copied from the article: "An understanding of how aviation is handled in Helsinki and Finland" (Bloch & Lassen, 2016, p. 16).

addition, the practices related to the negotiation of traffic rights and the focus on establishing sister airports in China also support this discourse due to the fact that these practices motivate for the discourse: "*Finland is an Island*". The rationality linked to this discourse is routed in the perception of Finland being isolated and depending on export along a decentral geographical location in relation to mainland Europe with the Baltic Sea between. This situation is to a high degree considered as a burning platform in Finland that motivates for political involvement.

In line with the thought from Jessop and my theoretical model of understanding airport governance (see section: 6.3 Airport Governance) founded in an approach where aviation is seen as embedded in the society, this case illustrates that the development of aviation requires involvement from several stakeholders. This wide approach is illustrated by the fact that the aviation strategy is developed with input from companies, different interest groups both related to commerce and tourism and long local and national authorities. Even though the Ministry of Transport and Communication as the main author of the aviation strategy in Finland had an objective to close some of the regional airports to strengthen the financial situation for the airport network system, local resistance influenced this decision. My analysis above shows, no official governance body in line with suggestions from Jessop was used (see section: 6.2 Governance); the outcome of the strategy which is a synthesis of different objectives, can be seen as a way to bridge the different goals within the aviation development and there for the acknowledgement of aviation as embedded in society. Further, the understanding of the function of aviation in Finland that enables different forms for social coherence motivates for a political engagement in the transport system to develop.

Therefore, as shown in this chapter, making hub airports can not only understood as an optimization of an airlines' business model. The production of aeromobilities and making of a hub airport must also be understood in relation to the specific place, which therefore needs not only to be seen as a neutral and passive node in the global aviation system but also a place filled with various forms of rationalities shaped within the local context. In addition, this chapter also illustrates that, the making of a hub airport in Helsinki is driven by a time perspective both in relation to the attention span of political awareness and Asian strategy but also in relation to the specific time in the geopolitical history (see also (Cresswell, 2006)). Additionally, as stated in Section: 4.3 Open Systems), the international political situation here in relation to China and Russia is a dimension that shows the production of aeromobilities are related to a timely perspective. Finally, the chapter also illustrates the different spatial scales involved in making the airport hubs, from the geographical location and the domestic spatial dimension and the airport-related spatial dimension are perspectives that need

to be addressed when understanding the production of aeromobilities and making airport hubs[105]."

[105] This epilogue draws on formulations and thoughts presented in the article: "An understanding of how aviation is handled in Helsinki and Finland" and is changed or updated with: additional reference to new analytical framework and focus (Bloch & Lassen, 2016, p.17-18].

9 CASE – BRUSSELS

"But, if you put things through a negative lens, one could say, we are our own worst enemy, because we could do so much better. If you had the full support of the full nation and all levels of government, which is to say "This is what we believe and despite the negative impacts, we will make it work, because it is the economic flywheel in this our economic center." (Head of Strategic Planning Brussels Airport 2016: 0:19:55)

"You must understand, first of all, the system in Belgium, the institution system, which is quite complicated" (Belgian Civil Aviation Authority, 2016: 0:02:58)

9.1 PROLOGUE

After I have analysed how the making of hub airports and the production of aeromobilities takes place in Amsterdam and Helsinki, I will in this chapter analyse the case of Brussels Airport. As I will unfold, the production of aeromobilities in Belgium and particularly in the Brussels Airport is founded on place-specific drivers that have a local to global span. The federal system is a key driver for developing aeromobilities since it facilitates a decentralized focus on Brussels Airport and dampens the development. Sabena airlines, the former national carrier and its bankruptcy have highly affected the production of aeromobilities in Brussels Airport. The bankruptcy and the later rebuild of Sabena SN must not only be seen in the light of failed corporate actions and market conditions. The situation must also to a great extent be seen in the light of local interests in the regions of Wallonia and Flanders combined with a market-oriented belief among politicians that the aeromobilities would be re-established due to strong international organizations in Brussels.

The configuration of the runways in Brussels Airport has large consequences for how the production of aeromobilities takes place. The direction of the runways is related to wind directions and optimizations of aircraft operations, but the layout causes flight paths over high-density housing areas and as a consequence, the noise externalities are highly politicized.

Despite the challenge with the noise externalities, political attention towards aviation is low – especially compared to the neighbour, the Netherlands. The low political attention can be linked to the regional setup that generates less political strength to focus development of the national airport at the expense of regional airports. One of the consequences of the regional setup has been significant growth at Charleroi and Liége airport, which have increased the competitive situation for Brussels Airport that

also faces an internationally competitive environment due to the geographical location among some of the largest airports in Europe.

The case of aeromobilities production in Brussels Airport shows that airports cannot be seen as pure flow machines, but they must be understood in relation to society. Aviation is a consequence of local, regional, and global relations held together in a web of Policies and Materialities. Based on my collected data, I have identified a discourse where the production of aeromobilities and making a hub airport in Brussels Airport largely is left to the market conditions and is under influenced by the federal state setup. I label this discourse: "*Decentralized production of aeromobilities*". This discourse is supported by articulation by various stakeholders and practices that do not provide a unilateral focus on Brussels Airport. Consequently, the aeromobilities production in Belgium doesn't live up to is potential which is encapsulated by this statement by Belgian Civil Aviation Authority:

> "*I would say that we are living quite good, but we are lacking a lot of opportunities. … perhaps we achieve only sixty or seventy percent of the potential we may have due to this. It is not a disaster, the fact that we continue to grow, but I am sure we could grow faster and higher than what we do today." (Belgian Civil Aviation Authority, 2016: 0:44:42)*

The overall learning for this case in relation to an airport governance model is that too much decentralized political orientations courses a challenge to have a unilateral focus on developing infrastructure development around the main hub airport. There can be many historical reasons and good arguments for such a decentralized focus; nevertheless, this damps the development and competitive strength of the hub airport.

9.2 COLLECTING DATA

I had a plan to interview stakeholder in Brussels in the spring of 2016, but unfortunately, the bombing of a Brussels Airport, 22 March 2016 put a hold on this. The suicide bombing caused the death of 35 people, including the three suicide bombers – one at the Maalbeek metro station in relation to another bomb[106]. It was first ultimo June 2016 – more than 3 months after the attack the airport was up and running at normal capacity[107].

[106] See: http://www.aviation24.be/airports/brussels/explosions-brussels-airport/ Located: 25 November 2017.
[107] See: http://www.check-in.dk/bruxelles-lufthavn-tilbage-i-fuld-drift-i-juni/ Located: 20 November 2017.

In October 2016, I traveled to Brussels to conduct my interviews. The interviewees are selected to have the perspectives from the Brussels Airport, Brussels airline, unions and regulator, which in this relation could be viewed to represent the official stands.

I had interviews at Brussels Airport: Björn Hassert, head of strategic planning, Belgian Civil Aviation Authority: Didier Ledur from the Policy Unit – Strategic cell and Kurt Callaerts, General responsible of the sectors civil aviation & maritime from ACV CSC unions. To supplement these interviews, I interviewed Frederic Dobruszkes, professor, Universite libre de Bruxelles, and Laura Deruytter, PhD researcher from Vrije Universiteit Brussel (VUB), who both have conducted research within Belgian aviation. Later in 2017, I set up interviews with Steven Decraene, a journalist from VRT News and Geert Sciot, vice president media relations Brussels airlines.
Below in Table 10 and Table 11 are a representation of the people I interviewed and documents I have used in relation to the Brussels case.

Interview persons	Title	Company/Organization	Representing
Björn Hassert	Head of Strategic Planning	Brussels airport	Airport
Didier Ledur	Policy Unit - Strategic cell	Belgian Civil Aviation Authority	Government
Laura Deruytter	PhD Researcher	Vrije Universiteit Brussel (VUB)	Academia
Steven Decraene	Journalist	VRT News	Press
Geert Sciot	Vice President Media Relations	Brussels airlines	Airline
Frederic Dobruszkes	Professor	Universite libre de Bruxelles	Academia
Kurt Callaerts	General responsible of the sectors civil aviation & maritime	ACV CSC unions	Union

Table 10: People I interviewed related to the Brussels case.

Document	Topic	Type/ Year
Strategic Action Plan for Reconversion and Employment (START)	Aviation Strategy	Regional policy / 2004
Strategic Vision 2040	Airport development plan	Company strategy / 2018

Table 11: Documents and strategies I have used in relation to the Brussels case. The is not many documents related aviation policies in Belgium

Prior to my interviews in Brussels, I tried several times to set up interviews with representatives of VOKA who is representing companies in Brussels and the Flanders region (Voka, 2017) but unfortunately, this failed. Only after my research and interviews, I realized that the regional setup in Belgium had a large influence on how the aeromobilities production takes place in Brussels Airport. Due to lack of resources, I did not set up interviews with representatives from the Wallonia and Flanders regions. Despite this missing perspective, the different interviewees do address this regional viewpoint.

Currently, there is a limited research focusing on Brussels Airport and particularly if the articles must be in English. I have identified the articles that I find relevant. I

cannot rule out that relevant articles have been written in French or Dutch, but I could not address these in my search for articles. There are several articles and a benchmark study where Brussels Airport is included, but the article listed below is directly concerning Brussels Airport. The following two articles I find relevant related to aeromobilities in Belgium:

"The (mis)fortunes of exceeding a small local air market - Comparing Amsterdam and Brussels"**.** This article is analyzing the why Schiphol is mush more success full in terms of connectivity compared to Brussels Airport. One of the main points in the article is that this difference in is due to the Dutch strategic planning: Mainport strategy (Burghouwt & Dobruszkes, 2014).

"Noise Reduction: The Postpolitical Quandary of Night Flights at Brussels Airport". This article focusses on how noise issues around Brussels Airport in the 2000s political was addressed from multi stakeholder perspective trying to bridge the environmental issues and the market development. In 2004 DHL (Cargo and logistic company) decided to reallocate their hub in Leipzig. Several reasons for this is listed in the article including an internal DHL optimization, since DHL was purchased by Dutch Post. However, it is also pointed out that due to local resistant in Brussels for the expansion planes by DHL, DHL decided to reallocate their hub. This article questions the postpolitical governance model ability address the controversies between market and local interests. (Oosterlynck & Swyngedouw, 2010).

These two articles both address important issues in the production of aeromobilities in Belgium, even though I will address some of the same elements, I will in this forthcoming chapter expand the understanding of different drivers behind the production of aeromobilities in Belgium and the making of a hub airport in Brussels.

9.3 HISTORY OF BRUSSELS AIRPORT

In this chapter, I will address the historical development of Brussels Airport.

Brussels Airport is located northeast from Brussels city. The airport is in the Flanders region. The airport has had three different locations; first, the airport was constructed in the area of Haren, later at Melsbroek, and finally at Zaventem. The airport facilities at Haren was constructed as a military location for airships during First World War. In the years to come, the airport grew due to military initiatives. During the military activities, the civil activities increased during the 1930s and the movements increased to 45.000 per year. In 1935, Congo was the first destination in Africa scheduled to be served. In 1940 the Germans invaded Belgium and occupied the airport (Van Humbeek, 2002, p. 101).

Figure 24: Location of Brussels Airport; Northeast of city of Brussels in the region of Flanders (Google Map, 2018e)

During the Second World War, the Germans started construction of a new airport in Melsbroek with three new runways for their military operations. After the war, civil activities moved to Melsbroek, where the civil airport finally opened on the 20th of July 1948. The responsibility for operating and configuring the civil airports were given to the Belgian Airport and Airways Agency (RLW/RVA) founded in 1946 (Van Humbeek, 2002, p. 101). In 1950, the airport had 240.000 passengers and in 1955, a new railway between the airport and the city center of Brussels was inaugurated. From 1951 the airport facilitated guide tours for interested people, who also could have lunch at the airport (Brussels Airport, 2017a). Guided tours were popular and in the three first months there were 6.000 visitors (Van Humbeek, 2002, p. 127).

This development was in line with what Roseau wrote, that after the Second World War "*Now it was not just the planes but the airport as a whole that was getting media attention and being turned into a suburban attraction*" (Roseau, 2012, p. 44).

Slowly, the numbers of passengers outgrew the Melsbroek airport and a new larger airport was needed. With this increased number of passengers, Belgium would host the World Exhibition in 1958 and therefore a new airport with more capacity was needed. In 1958, the Minister of Transport Anseele inaugurated the new Brussels

Airport at Zaventem, just south of Melsbroek. Over the years, two of the existing runways have been removed and replaced by two new runways and the last runways have been extended to the current configuration. The new terminal complex was constructed further south (Van Humbeek, 2002, pp. 228-229). The terminal complex design was by a constellation of three architects; one from each of the three regions in Belgium: Wallonia, Flanders, and Brussels. This constellation of the architects is interesting since it represents the regional setup in Belgium, which will have an influence on developing Brussels Airport. I will address this later in section 9.5.2 The Regional System and in section 9.6.1 The Federal System in Belgium.

In the following years Brussels Airport had several new facilities such as new hangars and runway modifications. Such as in 1966 a new cargo facility on the grounds of the former Melsbroek facilities (Van Humbeek, 2002, pp. 183, 200). In 1973 the new satellite facility was inaugurated to serve more wide-body aircrafts (Van Humbeek, 2002, p. 193) and finally, hangar 41 for jumbo jets was operational in 1983 (Brussels Airport, 2017f). Already back then (as I will address later in this chapter) there was an increasing concern regarding noise, which led to debate regarding reallocation of the airport, however, this was never realized (Van Humbeek, 2002, p. 191).

In the early 1980s the airport capacity was recognized to be insufficient and therefore a new masterplan: *Zaventem 2000* was presented in 1985 (Brussels Airport, 2017g). In 1994 a new terminal was inaugurated together with pier B, and in 2002 the new pier A. Latest in 2015 a new construction linking pier A and passengers terminal was opened and replacing a less convenient tunnel (Brussels Airport, 2017g).

In relation to Zaventem 2000, the professor, Universite libre de Bruxelles elaborates:

> *"In 1985, the Federal Minister of Transport unveiled a master plan entitled "Zaventem 2000" … The idea was that the airport was too small and too old and it was urgent to build something new. And then they discussed, and at the end, in 1987, they took the decision to rebuild. It was supposed to be done by the private sector, and at the end it cost so much that, of course, the public sector came to rescue the project. In 1985, I think there was one layout for the terminals and then someone went to America and saw – I don't know which airport – and they said it's what we need for Brussels, and they changed everything. And then there was an agreement at the federal government level that the thing between the first plan in '85 and the final plan in '87, but the principle is still the same, so we need a new large airport to accommodate increasing air services, and that's it." (Professor, Universite libre de Bruxelles 2016: #1 - 1:16:11)*

In 2016, a new strategic vision for Brussels Airport was presented. The new strategic vision is "*Brussels Airport is a long-term vision about the development of the airport,*

based on social, demographic and economic evolutions in the world, and in aviation in particular" (Brussels Airport, 2017d).

The strategic vision includes large new infrastructure expansions to facilitate future demands. It is stressed by the CEO of Brussels Airport: "*For us it is important that this takes place in a balanced approach between the economic development of the airport and the care for our environment"* (Brussels Airport, 2017e). By this, he indicates that the new infrastructure, the growth, and the externalities need to be handled by involving stakeholders. I will address this strategy in the coming chapters. The articulations of this strategy can be seen in the light of spatial location of the Brussels Airport close to the city center and the associated noise. I will address these issues later in this chapter.

9.4 BRUSSELS CONNECTIVITY

In Belgium there are in all five commercial airports located in different regions: Brussels Airport (Brussels-Capital Region), Chaleroi Airport (Wallonia), Ostend Airport (Flanders), Antwerpen Airport (Flanders) and Liegé Airport (Wallonia) as illustrated in the *Figure 25*.

Figure 25: In Belgium, there are five commercial airports located in different regions of the country, Brussels Airport located in the Brussels-Capital region is the largest international hub airport in Belgium (Google Map, 2018a).

In addition to the coming elaboration of the traffic and connectivity development - see Appendix E. Case of Brussels Airport, for graphical presentation of major traffic trends. The total departing seats in Belgium in 2017 was 20.5m and with a growth rate of 3.6% (CAGR) since 2008. There are no domestic air travel in Belgium, but European traffic did in 2017, consist of 83% of all departing seats, and 17% of the departing seats were for long-haul destinations. Brussels Airport is the largest airport with 76% of all traffic, while Charleroi had 21% of all traffic measured in departing seats. The residuals airport only contribute to less than 1%. From 2008 to 2017, Brussels Airport

had an increase of 2.2% (CAGR), while in contrast, Charleroi has increased by 10.6% (CAGR) – this significant growth in Charleroi can be linked to Ryanair and its performance in the airport. In Brussels Airport the largest carrier is Brussels SN with 38% of all departing seats, Ryanair has 10% and TUI Airline Belgium has 6%. In Charleroi, Ryanair is by far the largest carrier with 78% of the departing seats in 2017, while Wizzair and TUI Airline Belgium both had 10% (SRS seat data).

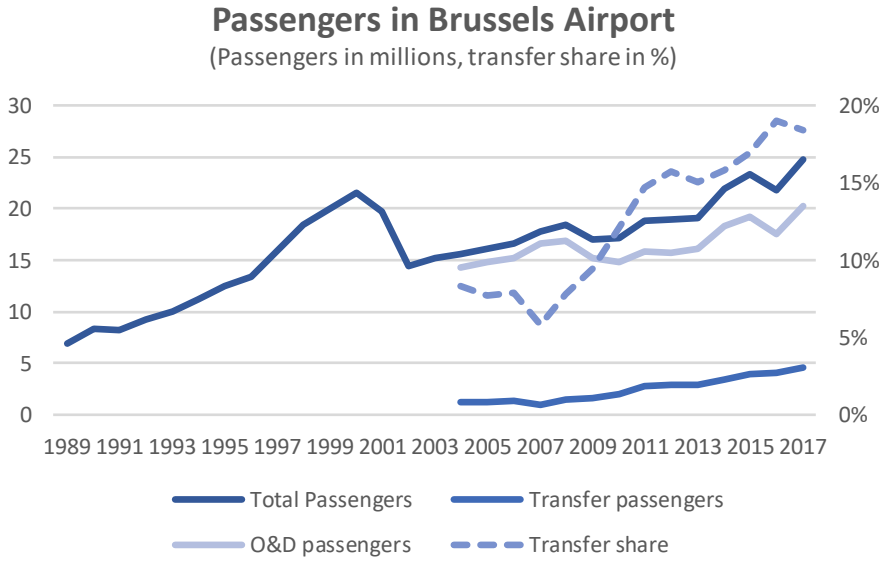

Figure 26: Development in number of passengers at Brussels Airport. After the bankruptcy of the national carrier Sabena in 2001, Brussels Airport lost 33% of its passengers. Since 2004, the level of transfer passengers have had an increasing trend – unfortunately, transfer data prior 2004 has be available. (Brussels Airport, 2005; Brussels Airport, 2007; Brussels Airport, 2009; Brussels Airport, 2011; Brussels Airport, 2013; Brussels Airport, 2015)

Brussels Airport had in 2017 24.8 million passengers and a 4.6 million transfer passengers. The passenger development has been growing with 3.7% (CAGR) since 2002. This was the low point in traffic level due to the bankruptcy of Sabena Airlines in 2001. In 2002, the number for passengers had dropped by 7.2 million passengers, or a decrease of 33%. First in 2014, 13 years after the bankruptcy Brussels Airport did reach the same level of passengers (Brussels Airport, 2005; Brussels Airport, 2007; Brussels Airport, 2009; Brussels Airport, 2011; Brussels Airport, 2013; Brussels Airport, 2015)

This development have can have different reasons, I will elaborate more on this in the chapters to come, but first I will present the current traffic situation.

Brussels Airport had in 2017 24.8 million passengers, and 81% of the traffic was departing towards Europe and 19% was towards long-haul destinations. Africa is the largest long-haul continent with 42% of all long-haul traffic and 26% of the long-haul traffic is bound for North America (SRS seat data). The large ratio of African traffic can be link to the historical relationship between Belgium and its former colonies in Africa. Belgium used to have two colonies in Africa: Belgian Congo from 1885 to 1960 and Ruanda-Urundi from 1916 to 1962[108].

In Brussels Airport, the transfer share in 2017 was 18% while in 2004 this was only 8% (see: Figure 26). This positive development equals an increase of 3.3 million transfer passengers or 250% from 2004-2017 (see: Figure 26). This significant increase should be understood in relation to the bankruptcy of Sabena 2001 – and therefore the baseline for the calculation is low. The airline Brussels SN had in 2017, 77% of all transfer traffic, while in 2010, the airline had only 49% of all transfer traffic, but at that time Jet Airways (Indian airline) had a 12.8% market share of all departing seats and 25% of all transfer traffic (MIDT data). After Jet Airways reallocated its European hub activities between India and North America from Brussels Airport to Schiphol Airport in 2016 due to increased cooperation with KLM[109], Brussels SN airline increased its transfer share percentage towards the level in 2017 of 77% of all transfer passengers (MIDT data). In 2017, the passengers transferring in Brussels Airport did consist of 49% that were transferring from Europe to Europe, while 41% were transferring between Europe and long-haul destinations, and 10% are transferring from long-haul origins to long-haul destinations. This is a significant change in relation to 2010, where the ratio of transfer passengers between Europe and Europe was 31% between Europe and long-haul destinations was 45% who long-haul to long-haul was 24%[110]. The high ratio of long-haul to long-haul in 2010, must be associated with Jet Airways operations, and after the reallocation of Jet airways, long-haul to long-haul transfer passenger, decreased and the relatively Europe to Europe transfer increased in 2017. However, in 2017 the ratio of transfer passengers travelling from long haul destinations to long haul destinations were 10% of all transfer passengers. Out of this 10%-share, 74% of the passengers were

[108] See: https://www.britannica.com/place/Belgian-Congo and https://www.britannica.com/place/Ruanda-Urundi Located: 17 September 2018

[109] See: https://www.routesonline.com/news/29/breaking-news/252371/jet-airways-drops-brussels-in-favour-of-amsterdam/

[110] The split of transfer traffic into transfer traffic between Europe/Europe, Europe/long-haul destinations or long-haul/long-haul are based on origin and final destinations. By this, e.g. if a 2nd transfer is taking place at another European airport for travel to US, the transfer in Brussels Airport is labelled as a Europe/long-haul destinations transfer. Even though the first airport after Brussels is European. This potential mis-interpretation may only relate to flight paths with more than one transfer airport. In the case of Brussels Airport (2017), 22% of all transfer traffic did transfer at another airport before or after Brussels airport (MIDT data). See also Appendix A. Connectivity Data

travelling between African via Brussels Airport to other long haul destinations. This illustrates that the Brussels Airport still have a strong link to Africa (MIDT data).

The connectivity in Brussels Airport evaluated by the NetScan model (see: 5.4 Analytical Process), illustrates that *Airport connectivity* from 2008 to 2017 has increased by 15%, but this is mostly driven by an increase in *Indirect connectivity* of 22%, since the *Direct connectivity* only has increased by 0.6%. The Hub connectivity has increased over the same period by 87%; this increase – even though it is based on the NetScan methodology – illustrates a large increase in the hub functions as the increase in transfer traffic also shows (ACI Europe, 2014; ACI Europe, 2015a; ACI Europe, 2016; ACI Europe, 2017a).

Overall, the connectivity in Belgium is depending on Brussels Airport and Charleroi Airport, where Brussels Airlines is the largest carrier in Brussels Airport and Ryanair is the largest in Charleroi Airport. Brussels Airport provides both connections to long-haul and European destinations with a growing share of transfer traffic. Due to historical reasons, Brussels SN and therefore Brussels Airport have a significant share of its long-haul traffic bound for Africa. There are no domestic aviation traffic in Belgium, even though this also is the situation in The Netherlands, it is stressed by Vice President Media Relations Brussels Airlines that this is a constrain in developing aviation traffic:

> *"We don't have domestic flights. Aviation is by its nature in Belgium an international activity, and not national activity, that's important to know."(Vice President Media Relations Brussels Airlines 2016: 0:04:16)*

After this short elaboration on traffic development and distribution, I will unfold the dimension of Policies in the case of Brussels.

9.5 THE POLICIES DIMENSION

In this section, I will analyze and identify the different policies behind the production of aeromobilities. Historical events combined with regional setup are elements pivotal for understanding how the production of aeromobilities takes place in Belgium. In section 6.5 Materialities, I will unfold the Materialities that together with the policies are facilitating the aeromobilities. It can be discussed in the sequence of this analysis; why policies before materialities and not the other way around. The two dimensions are interdependent, sometimes the policies affect the materialities and sometimes the other way around.

9.5.1 BRUSSELS AIRPORT – RELATION TO SOCIETY

In my interview with the Head of Strategic Planning at Brussels Airport, he addresses the function of the airport as the "s*ocial fabric of the cities it serves*". This is in line with the thoughts from Kesselring, who specific states: "[*They [airport] are Global transfer points mobility machines which indirectly impact and shape social life and regional and local identities and cultures* (Kesselring, 2010, p. 99)

The Head of Strategic Planning states:

> *"I would summarize that in an airport in the 21st Century, is intrinsically part of the social fabric of the cities it serves, the catchment area it operates in, and often also the region or the country in which it is located" (Head of Strategic Planning Brussels Airport 2016: 0:04:53).*

The benefits do not come without cost within the limits of the airport infrastructure, but also within the regional area, where the airlines expose the inhabitants for externalities. The head of Strategic Planning, Brussels Airport states:

> *"The thing is when you talk about the airport footprint, in my view, it doesn't end just with the lands that you have, because airplanes fly well beyond the land of the airport. At the same point in time, airplanes also don't fly in a very straight line. By that I mean, it is not just that you are either in the nice contour or you are outside of the nice contour. Airplanes overfly areas and always travels. That is part of the negative side of the growth of airports that you need to be cognizant of. That is part of your goal per social responsibility" (Head of Strategic Planning Brussels Airport 2016: 0:06:38.)*

An important facet of this duality is how this is approached by the airport. The formal license to operate is one dimension, but you action will also provide you with an informal license, as the Head of Strategic Planning Brussels Airport states:

> *"I think that when I talk about accountability or responsibility, that is what you do. That is absolutely what you do. That is how as an airport we earn our license to operate. Not just a formal one, but you need a social license to operate" (Head of Strategic Planning Brussels Airport 2016: 1:05:11).*

An important way to address this duality is by communications with stakeholders, as the as he additional states:

> *"You start that social dialogue. Again, we are not apologizing for growth, but we are also not dictating "This is what we are and this is what we much be." You listen to your community to say. We listen to our customers" (Head of Strategic Planning Brussels Airport 2016: 1:02:15)*

The approach toward a dialog-based approach to local environment is pivotal for the ability to be accepted and understood by the local inhabitants.

The newest strategy for Brussels Airport as mentioned in section 9.3 History of Brussels Airport includes significant expansion of infrastructures – such as new terminals, piers and better ground transport facilities. The expansion is needed to meet future demands and "*strengthen the position of Brussels and Belgium on the world map*" (Brussels Airport, 2017e). The strategy: *Strategic Vision 2040* is presented as a vision that are able to facilitated 60.000 additional jobs in Belgium by 2040, but it is important for the airport to have a balanced approach to this development, because the increased connectivity will increase the externalities. To address this challenge, Strategic Vision 2040 should be based on a dialog with stakeholders. The dialog will take place in a consultation forum called: *Forum 2040* (Brussels Airport, 2017e).

The *Forum 2040*[111] initiated by Brussels Airport is based on an open dialog with local inhabitant, companies and experts. As Brussels Airport state in their Principle for Collaboration: "*Brussels Airport Company wishes to enter into a constructive dialogue about its Strategic Vision 2040 with people living nearby, municipalities, companies and experts. To achieve this, we are setting up Forum 2040, in which everybody who may have an interest in the further sustainable development of the airport is represented. In Forum 2040, all interests and needs will meet"* (Brussels Airport, 2017c)

[111] When this section was written, the open dialog process related to Forum2040 was not started. However, in September 2018, when this thesis was finished, the four dialog sessions along a plenary session had taken place. Disregard of this, I will in this section highlights the principles behind Forum2040. See: https://www.brusselsairport2040.be/en/vision-2040/42/open-dialogue. Located 25 September 2018.

An independent jury will select 80 participants to be part of the forum, based on *"their motivation, their place of residence and their profile"*[112]. The jury is headed and moderated by Lode Willems[113], a former top diplomat with a long diplomatic career (Brussels Airport, 2017b).

An important dimension in such a dialog-based approach to address problems in relations to future infrastructures is how the infrastructure provider – here the airport – is bound to be the suggestions. Brussels Airport will use the *Forum 2040* for recommendations and advices and they have committed them self to take account of these, as they state in their Principle for Collaboration:

> *"The recommendations and advice formulated in Forum 2040 arise from the constructive dialogue within that forum. The airport makes a commitment to take account of them when finetuning the plan for the future of Brussels Airport"(Brussels Airport, 2017c)*

An important issue is how Brussels Airport will use the *Forum 2040* and "*take account"* of the outcomes. Parallel can be drawn to the Alders table in Amsterdam, but here the advices and recommendation from this forum was binding (see section: 7.5.2 Policies – The Duality of Aviation) this is a significant difference.

Based on the statement from the Head of Strategic Planning at Brussels Airport and the statements in the material concerning the *Strategic Vision 2040*, the relation to local inhibitors and other stakeholders is understood as vital for be ability for the airport to expand.

This approach is interesting because of the previous events, where DHL reduced its activity level in Brussels Airport influenced by the challenge within the political system to find solutions to noise externalities. One of the reason for this failure was the local resistant towards an increase in the level of night flights over different housing areas (Oosterlynck & Swyngedouw, 2010).

The dialog approach illustrates that the production aeromobilities happens in a nexus of different stakeholders that all are influencing various dimensions of this production. Further, the link to historical events can be drawn in order to understand the current articulations and practices.

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[112] Out of 230 potential candidates, 80 participants were selected. See: http://www.publicnow.com/view/A15B82BAA38D56746E685E8C2B06A4BDA6820485?2017-08-30-15:00:38+01:00-xxx5149 [press release]. Located: 25 September 2018.

[113] The Chairman for the Forum 2040, is headed by Lode Willems, a former "top diplomat and former chair of institutions such as the European economic commission of the United Nations and the Belgo-British Conference" see: https://www.brusselsairport2040.be/en/news/35/lode-willems-chairman-forum-2040. Located 25 September 2018.

9.5.2 THE REGIONAL SYSTEM

In this chapter, I will address the different position and attitudes towards aviation in Belgium from the different regions and from the federal state. These attitudes and position are expressed during my interviews from different stakeholders. They may not be stated in official documents, but the positions are expressions that constitute the nexus in which the production of aeromobilities are produced within.

In section: 9.6.1 The Federal System in Belgium, I will unfold the Materialities dimension that is the grounding for the positions articulated in these interviews.

As both the head of strategic planning at Brussels Airport and Belgian Civil Aviation Authority recognize, due to the federal setup, political decisions in Belgium happen in a landscape where there are many conflicting interests. They state:

> *"The important thing, of course, in any country, but in Belgium I would say is to make sure that you navigate the borders of politics. It is a fairly complicated political situation if you compare it to many other countries in Europe and in the world" (Head of Strategic Planning Brussels Airport 2016: 0:13:52).*

> *"You must understand, first of all, the system in Belgium, the institution system, which is quite complicated" (Belgian Civil Aviation Authority, 2016: 0:02:58).*

This institutional system imposes different view points that has to be accounted for. An example of this is case with DHL and their expansions plans at Brussels Airport announced in 2004. Among other factors in the lack of political solutions resulted in DHL reduced its activities at Brussels Airport (Oosterlynck & Swyngedouw, 2010).

9.5.2.1 Federal view on aviation

Despite the landscape of conflicting interests – which I will return to in section 9.5.3 Policies Towards Noise Externalities, there is an overall interest with in the Federal government to improving the connectivity to and from Belgium. A professor from Universite libre de Bruxelles expressed this position by highlighting different infrastructure constructed in Belgium.

> "*The state was still being very involved in expanding and modernizing the airport and governizing high-speed lines to be connected to France, Germany, and the Netherlands. So I think that's really an interesting point. And also we have the Port of Antwerp and*

> *the Port of Zeebrugge, so for sure we are – maybe not as much as the Dutch – but we are still very concerned about international connectivity. That's something that should be highlighted" (Professor, Universite Libre de Bruxelles 2016: #1 - 0:11:42).*

The focus on national connectivity both by sea, rail, and air; an overall policy with focus on the national airport is difficult due to the regional setup and the potential conflicts. A national focus – as the one in the Netherlands with a national focus on Schiphol airport – it could lead to an institutional problem due to potential conflicts with regions. As Belgian Civil Aviation Authority states:

> *"Brussels is considered as national federal airport. All the others are regional airports. … We may have a policy for the national airport, but, of course, if we have a policy for the national airports and we create a competitive landscape with the regional airports, we will have institutional problems between the federal government and the regional governments. We must be very cautious on this" (Belgian Civil Aviation Authority, 2016: 0:05:25.)*

The head of Strategic Planning Brussels Airport, acknowledged there are not a specific national aviation strategy, but there may not have to be, as long as there is an agreed way forwards, as he states:

> *"Is there a national aviation policy?" Not as such, and I don't necessarily say you would need a national aviation policy, but you would want to have an agreed way forward that all bodies will stick to in the long-term. That may not be that you get everything that you could ever ask for as an airport, because you need to have a balanced view on that" (Head of Strategic Planning Brussels airport 2016: 01:07:10).*

The lack of federal focus on aviation policies are further supported by the Vice President of Media Relations of Brussels airlines:

> *"We have seen a lack of federal aviation policy because the two regions were doing their thing, and the national level -- The only thing not really happens was, major decision - that was a decision taken 20 years ago now, or even more than 20 years, above 20 years ago was to privatize Brussels airport to sell the majority of the shares in the airport" (Vice President Media Relations Brussels airlines 2016: 0:09:27).*

The representative for the Belgian Civil Aviation Authority continues by expressing how the federal setup negatively have affect a potential federal policy focusing on the Brussel airport as a national airport, as he states:

> *"If we decide to focus on Brussels Airport as federal government, as federal politicians and so on, we will have an explosion on the day after. In Liege, with the regional government, it could be the war between the regional and the federal government, immediately. It is very difficult" (Belgian Civil Aviation Authority, 2016: 0:42:50).*

One issues are concerning federal investment projects, that if one region perceive funding the other regions want the same, this create a difficult situation:

> *"If Charleroi asks for direct connection…[by a] train station within the airport, the federal government will have to pay that in the interest or in the benefit of Charleroi and then you will have the Flemish region who will say, "Hey guys, you gave a lot of money for Charleroi. What is for us?" That is always the case. I give five to them and I need to give five to them" (Belgian Civil Aviation Authority, 2016: 0:52:15).*

In contrast to the neighbor country, the Netherlands has a very strong national focus on Schiphol and KLM, which is not the case in Belgium, as the vice president of media relations of Brussels airlines states:

> *"[The Netherlands has] one of the important aviation and cargo hubs in Europe with Schiphol, KLM and everyone in the Netherlands is convinced of this national interest. Unfortunately, we don't see a similar trend in Belgium unfortunately" (Vice President Media Relations Brussels Airlines 2016: 0:22:57).*

Additional he elaborates in relation to this lack of national aviation policy:

> *"Unfortunately we are lacking a federal aviation policy and that has to do with the structure of our country, and the dynamics of the regions especially." (Vice president Media Relations Brussels Airlines 2016: 0:00:38)*

A professor at University Libre de Bruxellers supports this lack of a plan for national aviation, as he states:

> *"I think we are not like the Dutch. We don't write a global plan and we say we would be the mainport country or something like that …*

> *I'm not sure there is a plan, like the Dutch would have." (Professor, Universite Libre de Bruxelles 2016: #1 - 0:12:22)*

One of the challenges is in relation to the Netherlands due to the development of the airports in Belgium, the traffic is distributed among all the airports in Belgium, there is not just one airport with the majority of traffic but in Belgium multiple airports to be taken in to consideration.

> "*The Netherlands is not a federal country. Schiphol is 95% of the aeronautic activity in The Netherlands. So, they have one item to discuss. It is Schiphol. They have Eindhoven, they have Maastricht, but there is quite nothing there. If you are looking to Belgium, 2015, 30 million passengers of which 22 million in Brussels, 7 million in Charleroi, and the rest in the other airports" (Belgian Civil Aviation Authority, 2016: 0:41:49).*

This lack of national focus on Brussels Airport generates a climate where there are suggestions to reduce traffic at Brussels Airport by moving it to other parts of the country, as the vice president of media relations of Brussels airlines states:

> *We don't have that strong support that Netherlands has, the Netherlands for example how much energy they put everyone that's convinced of the importance Schiphol for the economy and every thing. The challenge of Brussels Airports to convince the regions of the importance of Brussels Airport is much more difficulty. We have even people saying, "Let's reduce the flight from Brussels Airport." Or, "Let's move out of Brussels Airport." Things like that. In the regions, these things happen, these things happen. They don't see always that the national interest, the general interest anymore because of regional politic." (Vice president media relations Brussels airlines 2016: 0:22:14).*

These articulations related to the production of aeromobilities in Belgium indicates that the federal setup course a lack of possibilities of the federal government to facilitate a national plan for aviation in Brussels Airport.

9.5.2.2 Regions point of view on aviation

The three regions in Belgium: Wallonia, Brussels and Flanders have over the last decades gained more independence from the federal government. I will address this development further in the Chapter: 9.6.1 The Federal System in Belgium. As part of this independence, Wallonia and Flanders became responsible for airport policies in

their regions. This development is pointed out by the Vice President of Media Relations of Brussels airlines:

> *"Since we've seen this regionalization, Wallonia discovered very early the importance of the potential of aviation, I should say. They started developing the two airports, Charleroi and the Liège Airport basically 15, 20 years ago, but by taking a strategic decision at the time to develop Charleroi as a passenger airport, and Liège as a cargo hub. Two Flemish airport Antwerp and Ostend situated in the Flemish parts of the country. During many years, all these last five years we have seen dynamics there, similar dynamics to attract airlines. Before the work was seen as a strategic activity by the Flemish government. Flemish Government focuses much more on the ports, not on aviation, but that have changed when they privatized the two airports in the Flemish part of the country" (Vice president Media Relations Brussels Airlines 2016: 0:06:35).*

The region of Wallonia owns two airports[114]: Brussels South Charleroi Airport with passenger traffic and Liegé Airport with cargo traffic and some passenger traffic. In the region of Flanders, there are two privately-owned airports with scheduled traffic: Antwerp International Airport and Ostend–Bruges International Airport. Since Brussels Airport is in the region of Flanders, Flanders has a significant interest in Brussels Airport. The region of Brussels do not have any airport, but there is a strong ground transport network towards the Brussels Airport; the only national airport. As the vice president of media relations of Brussels airlines states:

> "*That's also different dynamic with two Flemish airports in the hand of private companies. Private company was doing that as a group. On the other hand side, the Wallonia airport is still to see a strong government involvement, and for Wallonia aviation is one of the key in their strategic development. Aviation for them really considered as one of the top activities. Then we have that national airport of Brussels, and that national airport of Brussels from where we as Brussels Airlines operate, that is somewhere in between everything actually. This is a national airport, so the national federal minister is dealing with it, not the regional minister, but the federal. Although*

[114] According to *ACI EUROPE Report: The Ownership of Europe's Airports 2016*; Brussels South Charleroi Airport and Liegé Airport are "*Mostly public*", Antwerp International Airport, and Ostend Bruges International Airport are "*Fully private*", while Brussels Airport is "*Mostly private*" - see page 8 in the report.
https://www.aci-europe.org/component/downloads/downloads/5195.html. Located: 25 September 2018.

> *the airport is situated on Flemish soil, Flemish territory*" *(Vice President Media Relations Brussels Airlines 2016: 0:07:37).*

First, I will address the aviation policy in Wallonia and their two airports, Brussels South Charleroi Airport and Liège Airport. I will return later to the Flemish aviation policy later in this chapter.

Wallonia Aviation Policy[115]

The process of regionalization – and the regional ownership of airports, which I will return to in section: 9.6.1 The Federal System in Belgium – made Wallonia recognize the potential in aviation and has a focus on development of its two airports: Charleroi and Liegé. An example of this focus can be seen in the development of Ryanair at Charleroi airport. The vice presidentof media relations of Brussels airlines states:

> *"Yes, on the regions, and the regions compete like Charleroi has done everything to keep Ryanair to let Ryanair grow, and what is not easy, they don't understand the national interest. They don't see the national interest by having a strong Brussels Airport because they're focusing on their own airport" (Vice President Media Relations Brussels Airlines 2016: 0:20:15).*

This statement from the vice president of Media Relations of Brussels Airlines, should be seen in light of the fact that he represents Brussels airlines, who is competing with Ryanair. If you disregard this point, the statement still indicates a regional focus in contrast to a national focus on development of aeromobilities at the national airport: Brussels Airport.

One reason for this focus on a regional airport could be due to the political setup that motivates the regions to focus and invest in their own airports instead of a focus on the national airport. The head of strategic planning Brussels Airport states that the government of Wallonia has a motivation for this regional focus because of voters:

> *"So, if, as the government of Wallonia, you have one Euro to spend and one vote to win, you need to decide "Which airport am I going to support?" It becomes quite attractive to support airports in your own constituency, because all the Belgian employment is a critical consideration in your decision making, but the employment within your local area of influence is more critical because these people vote for you. That makes it a very complicated thing to navigate" (Head of Strategic Planning Brussels Airport 2016: 0:15:56).*

[115] I have not been able to locate any documents related to the Wallonia aviation position, therefore this perspective on Wallonia aviation strategy is only based on my interviewed persons.

Flanders aviation policy

In contrast to Wallonia, Brussels Airport is in the region of Flanders. This makes the Brussels Airport an important asset in jobs creation and economic development on one side, but also a challenging situation due to the externalities the airport produces.

The action plan from 2004: *Strategic Action Plan for Reconversion and Employment* (START) is recognized aviation as a main engine for the Flemish region, but this has to go hand in hand with protecting the local residents, investor trust and development of airport, as stated in START:

> *"The objective of the Flemish Government is, on the one hand, to develop the Brussels Airport area while protecting the interests of the people living in the vicinity, employees and employers. On the other hand, investor confidence needs to be restored. According to the Spatial Structure Plan for Flanders, Brussels Airport is one of the main engines (the so-called 'international gateways') of the Flemish economy. The Flemish Government had a long-term vision (strategic vision note) developed for the airport policy until 2025" (Flamish Government, 2004).*

START has a main objective to improve the ground transport to and from Brussels Airport. An example of this is the Diabolo project from 2012, which is a new rail track to improve access to the airport. Further, the START highlights the importance of development industries in the surroundings for Brussels Airport *(Flamish Government, 2004).*

In contrast to the Wallonia anticipated position; there is an explicit support to the development of the Brussels Airport, due to the location of Brussels Airport in the Flemish region. As a professor at Universite libre de Bruxelles states:

> *"The federal state and Flanders are supporting the facts to expand the [Brussels] airport." (Professor, Universite libre de Bruxelles 2016: #1 - 0:39:35)*

The regions – especially the region of Wallonia – have their own aviation agenda on what they want to promote. This creates a challenge for Brussels Airport as a federal or national airport. As the Vice President of Media Relations of Brussels airlines states:

> *"It's not easy for the [Brussels] Airport because it's a federal thing. The regions are doing their own thing, and the Wallonia region for example, was also represented in the federal government. They really don't like development of Brussels Airport, they want to develop their*

> *own two airports. (Vice president media relations Brussels airlines 2016: 0:10:08)*

Due to the regional system, there are different interests that need to be accounted for to understand the production of aeromobilities in Brussels Airport.

Articulations and practice in relation to Wallonia indicates a discourse where the airports of Wallonia are in focus. However, these articulations concerning aviation policies in region of Flanders indicates a discourse to support to development of Brussels Airport, but it has to go hand in hand with externalities in the region. It is within this nexus of different discourses, the production of aeromobilities takes place.

Because of these different discourses there is a common approach towards solutions based on consensus, as Belgian Civil Aviation Authority states:

> *"And Belgian is a specialist of consensus. There is often, in the very large majority of cases, consensus" (Belgian Civil Aviation Authority, 2016: 0:16:20).*

This consensus based approach is also illustrated back in the 2000s where the Belgium government established an aviation practice, that based on "*market actors, environmental concerns, and social objectives"* (Oosterlynck & Swyngedouw, 2010, p. 1577) were trying to bridge the interest of the market and several stakeholders. Unfortunately; the DHL, did not response positively and they moved most of their hub activities cargo to Leipzig in 2004.

9.5.3 POLICIES TOWARDS NOISE EXTERNALITIES

Besides the lack of national plan and policies for aviation in relation to Brussels Airport; the production of aeromobilities at Brussels Airport is highly influenced by noise externalities.

As I will address later in the section: Materialities dimension, Brussels Airport is located close to Brussels and with runways constructed towards Brussels city. Because of these materialities, noise externalities do influence the production of aeromobilities in Brussels Airport. In this section, I will address how this challenge is addressed in Belgium.

In Belgium, air traffic management is facilitated by the autonomous public company Belgocontrol (Belgocontrol, 2017). The company handles air navigation service in the civil airspace over Belgium and in relation to Belgian public airports (Belgocontrol, 2017). Belgocontrol decides which flight path aircraft should use when approaching and taken off from Brussels Airport. The flight paths are – among other things –

dependent on what runways in Brussels Airport that are in use but also what path the aircraft follow when the aircraft is airborne.

Since the Belgocontrol influences the flightpaths, they also influence the runway use and thereby the capacity of these. This can occasionally be a challenge among stakeholders. The vice President of Media Relations of Brussels Airlines states that the Belgocontrol is a difficult stakeholder:

> *"The most difficult stakeholder right now is the air traffic control organization, Belgium Control. Over the last seven, eight years, they had to change almost all years the routings of flights, almost every year. With a serious impact on the capacity of the runway because if you start in runways, you have no capacity. We have seen our punctuality going down as a certain runway at Brussels Airport" (Vice President Media Relations Brussels Airlines 2016: 0:52:50).*

The Vice President of Media Relations of Brussels airlines continues by stating that using runways is a political decision:

> *"Because also a lot of protest from regions and this new minister and she says, "Okay, let's change it." And let's fly for example between six and seven in the morning from that runway, and then they change the plan, but then they use the runway that has less capacity, and as a result we have the ease of flight and punctuality - like that" (Vice President Media Relations Brussels Airlines 2016: 0:53:24).*

Besides the distribution of noise and how this influence the capacity at Brussels Airport, there is another challenge in relation to noise, flight paths and the regions.

In the Flemish and Brussels regions there are different threshold for noise. The vice President of Media relations of Brussels Airlines states that due to these different noise limits an aircraft departing from Brussels Airport in the Flemish region is sometimes penalized with a fine when they reach the Brussels region. As he states:

> *"The whole noise discussion that we currently have which is a very painful and shameful situation that we are facing. Whereby, there are different noise limitation standards for the Flemish region and for the Brussels region, and that makes an aircraft that takes off from Brussels Airport situated on Flemish area that in the air the Brussels territory it was fine because it is too much noise" (Vice President Media Relations Brussels Airlines 2016: 0:08:36).*

The Vice President of Media Relations of Brussels Airlines elaborates further on the situation, that can cause airlines to be fined EUR 10.000 and the situation is due to a political conflict between the federal government and the regional governments:

> *"It's completely blocked at federal government level because the political parties in the federal government are not the same as in the regional government, and these parties don't agree, and these are pure political game. It's a pure political game that is going on now and it's hijacking the airlines, operating from Brussels Airport. We are seeing airlines leaving Brussels Airport because of this, because you get fines of 10,000 of Euros. When you take over in the morning, fines come from Brussels not from Flanders region although the airport is in the Flemish region" (Vice President Media Relations Brussels Airlines 2016: 0:34:11).*

This chapter illustrates that the aeromobilitiy production at Brussels Airport takes place in very complicated political setting, where distribution of externalities are influence by politicians and that the actual capacity at Brussels Airport are affected by these decisions. Further; due to these conflicts; airlines are receiving fines for flying altitudes allowed in one region but not in another, this situation is also political motivated.

9.6 THE MATERIALITIES DIMENSION

After I have unfolded the different policies regarding the production of aeromobilities in Belgium I will in this chapter open and analyze the Materialities dimension in my framework for understanding the development in aeromobilities in Belgium (se section: 6.5 Materialities). The Materialities consist for different forms for infrastructures, but also government setup and the development of main carrier at Brussels Airport. Further, I will also address this development regarding regional airports.

9.6.1 THE FEDERAL SYSTEM IN BELGIUM

To understand the different conflict of interests as addressed in the chapters concerning the Policies dimensions, I will here address the federal setup in Belgium.

Belgium is a federal state with the federal government in Brussels. The government consists of no more than 15 members and the federal ministers in the government must be equally divided between Flemish and Wallonia ministers, as the professor from Universite Libre de Bruxelles states.

> *"…in the federal government; half must be Flemish and the other half French. It's set by the law" (Professor, Universite libre de Bruxelles 2016: #1 - 0:34:22)*

In the constitutions of Belgium §99 it is stated that the Council of Ministers must not exceed 15 and the number of Dutch and French speaking ministers must be equal. This strict division is with exception of the prime minister. In §99 in the constitutions it is stated:

> *"The Council of Ministers is composed of no more than fifteen members. With the possible exception of the prime minister, the Council of Ministers is composed of an equal number of Dutch-speaking members and French-speaking members (The Belgian Constitution, 2017, p. Article 99).*

Within the federal state, there are three regions: Brussels capital region, Walloon region and Flemish region further there are three languages areas, where the Flemish region speaks Dutch/Flemish, the Walloon region speaks French and German (only a minority and Capital region Brussels is bilingual) (N. Larsen, 2017; Ypersele de Strihou, 2017).

An interesting perspective is that the federal government is at the same level as the regional governments.

> *"In Belgium, the regional government is on the same level as the federal government." (Belgian Civil Aviation Authority, 2016: 0:07:34)*

The setup where the regional government and the federal state are at the same level can cause some challenge with a national aviation policy as stated in the chapters regarding Policies dimensions.

Consequently, of the regionalization process in the late 1980s, the regions were giving more interdependence and more activities were transferred from the national government to the regions, as a professor, Universite Libre de Bruxelles states:

> *"In the late '80s, so at the time we were giving much power to the region."* *(Professor, Universite Libre de Bruxelles 2016: #1 - 0:11:10)*

Due to the transfer of activities to the regions, few activities are left at the national level; the regions became responsible for economic and regional airports. Only Brussels Airport was still kept as a national airport. The Vice President of Media Relations of Brussels Airlines elaborates:

> *"They [regions] are now accountable for their own economic development, economic policy. We only have a few national activities left, that's the police. Police and army is still a national activity, then we have some other things that other major infrastructure things like, for example, the ports of Antwerp, ports of Zeebrugge like some other activities ... We only have a few national institutes' left. The airport [Brussels Airport]is one of them, the national railway company is another that is still at national level, but for the rest we don't have a lot of national activities left"*
> *(Vice President Media Relations Brussels Airlines 2016: 0:04:16)*

The Vice President of Media Relations of Brussels airlines, further states that the regional airport was handed to the regions since there were no activities at the airport at that time:

> *"In the whole federalization, … there was almost no activities at the regional airports, they were sleeping. They were heavily lost making and sleeping. Antwerp had three flights a day to London and that was it. Ostend had five cargo aircrafts a day and that was it. Charleroi had only general aviation and that was it, and from time to time a passenger non-scheduled flight. Liège had four cargo flights a day; it was no hub of TNT for example, in the Liège like you have today.*
>
> *At that time, people were not thinking, "Okay, we can give airports to the regions; they're heavily loss making not even to them"" (Vice President Media Relations Brussels Airlines 2016: 0:24:12).*

Only Brussels Airport is still managed by the federal state since it is a strategic asset. As the professor, Universite Libre de Bruxelles states:

> *"Brussels Airport is the only airport managed by the federal state. … That's a crucial point because all the other ones [airports] depends on the region. Only the last airport, the federal state is competent for and, of course, it won't change because it's so much strategic that it would never be given to a region*" (*Professor, Universite Libre de Bruxelles 2016: #1 - 0:10:04)*

As part of the regionalization process – and in order to help the regional airports it was decided that cost for air traffic control provide by BelgoControl and security control at airports should not be paid by the regional airport but funded by activities at Brussels Airport. Due to this historical setup there is an uneven competitive situation between the airports in Belgium, as the Vice President of Media Relations of Brussels Airlines states:

> *"When the federal government decided years ago to give the regional airports to the regions, they also decided that the regions do not have to pay for example, for certain services. For example, air traffic control at the airport, and another thing, it's security. Where by passengers flying from Brussels Airport have to pay in the airport charges for security. They don't have to do that when they fly from the region because it's governed by the region, so there is no passenger contribution there. That's an important thing, and that's a real problem in the level playing field.*
>
> *Another big issue is that, the air traffic control organization of Belgium called Belgo Control, Belgo control generates it's revenues from Brussels Airport, and find to certain activities for the region airport with the revenue stimulated by Brussels Airport. The regional airports are not contributing to certain activities of Belgo Control. For example, the air terminal navigation charges mustn't pay at the regional airport where passenger fly from Brussels Airlines, fly from Brussels have to pay for this service. That is the problem of level playing field airlines operating from Brussels Airport to them and say this has to change even level control says this has to change. It's one of the thing that they decided to do when it was almost no activity at the region airport, but the situation has changed drastically since then with the growth of Charleroi, the Liège, and now we also see Antwerp and Ostend growing." (Vice president media relations Brussels airlines 2016: 0:12:38)*

Another example of how the regional setup affects Brussels Airport can be seen in the approach towards high-speed trains. Ground transport is important for production of aeromobilities, and due to the regional setup, Brussels Airport has no train stations that are attached to the high speed train system in Belgium even though the high-speed rail is 1 km away from the airport. As the vice president of media relations of Brussels airlines states:

> *"At that time it was decided that the [high-speed] train could only make stops in three Belgium railway stations, … they decided to have one railway station in Brussels, one in Flanders at Antwerp, one Wallonia at Liège." (Vice President Media Relations Brussels Airlines 2016: 0:41:31)*

The Vice President of Media Relations of Brussels Airlines continues by stating that each region and the city of Brussels got a train station, while the airport did get one:

> *"The two regions got their railways at the high speed railway station, and network, and Brussels Airport, they can use Brussels [train*

station], which is not the same, which is not the same obviously." (Vice President Media Relations Brussels Airlines 2016: 0:41:57)

In this section, I have unfolded some of the materialities such as the federal system with an even numbers of Flemish and Walloon members in the federal government. How the regionalization did transfer the regional airports to the regions and how this coursed an uneven competitive situation among airports, since Brussels Airport still have to carry some cost for the production of aeromobilities in regional airports. Further, influenced by the regional setting it is argued that, Brussels Airport do not have a train station for high-speed trains, which does not provide the best condition for ground transport to and from the airport.

9.6.2 BRUSSELS AIRPORT

In the section 9.3 History of Brussels Airport, I elaborated on the development of Brussels Airport. In this section, I will briefly address the location of the airport and the associated noise issues. This is pivotal to be aware of the noise externalities in relation to understand the the production of aeromobilities and the making of hub airport in Brussels. Later I will address the current strategy development plan for Brussels Airport called *Strategic Vision 2040*

Location of Brussels Airport and noise issues

As addressed previously, the Brussels Airport is in the Flemish region northeast from the city of Brussels. Due to the prevalent wind-direction, the two main runways are facing towards the city, consequently the flights approaching and taking off from Brussels Airport have a flight path towards west of the airport over the city of Brussels and the surroundings, therefore the associated noise is a challenge. The location and flight paths are illustrated in the figures below.

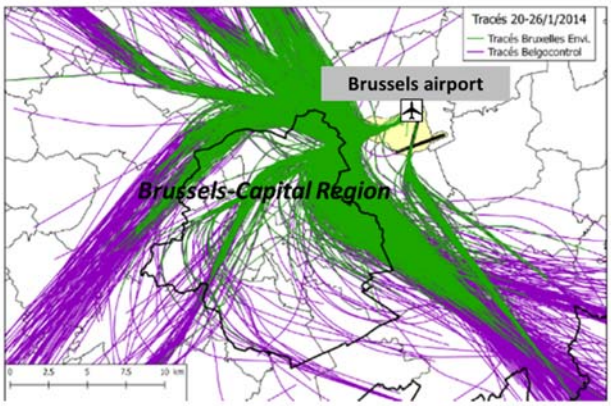

Figure 27: Flight paths over city of Brussels and surroundings (Dobruszkes, Peeters, & Bienfait, 2016, p. 13)

The challenge of the level of noise externalities are illustrated by the number of annual complaints. A professor from Universite Libre de Bruxelles estimates that every year the federal administrations receives more than 1 million complains:

> "*The airport doesn't receive, the administration receives. I think the record is more than 1 million or something like that" (Professor, Universite libre de Bruxelles 2016: #1 - 1:05:40).*[116]

[116] From 2002 to 2016 the number of noise complaints handled and managed Brussels Airport Mediation equals a total of more than 14 million complaints with an average per year of 948.677 noise complaints. The level of complains varies much per year with the lowest number in 2002: 1.336 noise complaints and the highest number in 2009: 6.931.299 noise complaints. Per year the complaints: 2002:1.336, 2003: 2.281, 2004: 40.973, 2005: 223.881, 2006: 478.429, 2007: 1.271.294, 2008: 1.272.749, 2009: 6.931.299, 2010: 3.666.296, 2011: 7.936, 2012: 6.721, 2013: 9.771, 2014: 89.275, 2015: 107.892 and 2016: 120.017. (Brussels Airport Mediation, 2016, p. 102] – I have no information of the actual complain format, are the filed e.g. by individuals, or by organizations? Despite this consideration, the levels of complains indicates significant attention towards noise externalities in relation to Brussels Airport.

Historically there have been several attempts to solve the noise challenge; one setup based on a concentration of flight corridors over specific housing areas and then subsidies for noise insulation. Due to large protests, this approach was not implemented (Oosterlynck & Swyngedouw, 2010). As I addressed in the section 9.5.3 Policies Towards Noise Externalities noise issues are still not solved and a highly political issue.

The new development of Brussels Airport: Strategic Vision 2040

As I have addressed previously in section 9.5.1 Brussels Airport in late 2016 presented a new *Strategic Vision 2040*. The CEO of Brussels Airport stated that the new strategy plan needs to be have a balance appraoch: "*For us it is important that this takes place in a balanced approach between the economic development of the airport and the care for our environment"* (Brussels Airport, 2017e). An interesting perspective is the license to operate and the *Forum 2040*, which involved several stakeholders and their viewpoint. The new strategy includes significant capacity expansions; such as two new peers, baggage facilities and commercial activities. Beside these infrastructural investments, there will potential also be constructed facilities for the public such as "*pavilions for weekend markets and community events*" (see Table 12). These facilities do not directly provide new capacities for the production of aviation but can be seen as infrastructure that increases the local engagement and involvement in and around Brussels Airport. These investments are interesting in relation to the statement from the CEO of Brussels Airport.

Below is a table with some of main infrastructural elements suggested to be constructed within the strategy plan for Brussels Airport: *Strategic Vision 2040*.

Investments in capacity infrastructure	Investments towards public interests
Two new piers	Co-creation / community engagement – such as open spaces and pavilions for weekend markets and community events
Entrance and check-in concept	
Baggage and airport services	
Taxiways, apron and de-icing platforms	Airport and passenger experience (could belong to both investment categories)
Cargo facilities	
Hotels and commercial officies	Plan spotting decks
Access infrastructure incl. Intermodal hub for train, tram, bus, coach and taxi	
Parking facilities	
Fire stations – construction already started	

Table 12: Investments that are underconsideration in relation to realize the strategy: Vision 2040 for Brussels Airport. The investments do both include capacity investments but also investments in the interest of the public. The table is a summary of major investments presented online; therefore, the table is not a complete listing of all potential investments. (Brussels Airport, 2017i)

An interesting dimension in the investment plans related to the Brussels Airport current strategy: *Vision2040* is the fact that the investment includes elements that are directed towards the public interaction with the airport such as market places and sight-seeing platforms, not only capacity infrastructural investments.

9.6.3 DEVELOPMENT OF SABENA AND BRUSSELS AIRLINES

In this section, I will elaborate on how the Belgian regional system affected the development of former national carrier Sabena – the precursor for Brussels Airlines – and how this in the end affected the aeromobilities production in Belgium.

Sabena the former national carrier went bankrupt in 2001, since its owner Swissair had financial problems due to large investments in new aircrafts along the decline in air travel activities after 9/11 attacks in New York 2001 (see section: 10.6.4 Swiss). Sabena was at the time the largest airline operating from Brussels Airport, and therefore the bankruptcy had severe consequence for the production of aeromobilities at Brussels Airport. It is estimated that number of direct routes were reduced by 50% and 75% of all international destinations were closed. Beside that loss of connectivity, the bankruptcy also coursed significant loss of jobs; previously it has been estimated that the loss of direct jobs was 17.000 (Transport- og Energiministeriet, 2005, p. 46).

Compared to Swissair (see chapter related to the case of Zurich Airport: 10.5.2.1 Civil Aviation Policy Report 2004), the Belgian government did not provide sufficient financial backup to keep Sabena flying. Even though the European commission granted the Belgian Government permission to give provide financial support (Doganis, 2010, p. 55), it was not enough to prevent the bankruptcy of Sabena in 2011.

The direct reasons for the bankruptcy of Sabena is addressed above, but there was also a tension between the regions and the Sabena, that not necessarily supported a reconstruction and financial support of Sabena. As stated by several interviewed persons, some reasons can be found in the conflict of interest between the Wallonia and Flemish region.

The Flemish region would not support a reconstruction of Sabena, due to a perception of Sabena being too French, as a professor from Universite libre de Bruxelles states:

> *"… I think Sabena was really a national symbol, and in a country you are dividing everything. In French we say la Belgique a papa, so it means the Belgium of fathers, it's the old-style Belgium. We have some symbols like that, and Sabena was a symbol, so it could be that at least some Flemish minister had said: No, it is over with Sabena and we'll go for another stuff" (Professor, Universite libre de Bruxelles 2016: #1 - 0:16:40)*

The journalist from VTR news supports this viewpoint, he states that Sabena was perceived to be too French, and therefore the Flemish region did not want to support as reconstruction of Sabena:

> *"For the Flemish speaking people, they always thought Sabena was a French speaking, money swallowing airline … For the French speaking, they thought well, it's only providing [access] to Brussels Airport, so they never did something for the region so, you felt a problem there as well. Then, even the airport, Brussels Airport company at that time they felt that they were runned by Sabena because, Sabena was then having - they almost had a 10 million [passengers] a year at the highest peak so they felt they were the owner of Brussels Airport at that time, so the relationship between airport and airline was not at that time, so well" (Journalist VTR news 2016 0:15:38.)*

This statement illustrated further that there was a significant tension between Brussels Airport and Sabena. Further, there was little support from Wallonia, as the region had developed Charleroi airport with the airline Ryanair. As the journalist from VTR news states:

> *"They [Charleroi airport] had 2 million [passengers] at the time, we say: "well, we can take some of the flights from Brussels into Charleroi, so it could be good for our regional development". We had all different actors playing together, which meant that Sabena all of a sudden was not so attractive to save it anymore." (Journalist VTR news 2016 0:21:49)*

Beside the lack of regional willingness to support Sabena, the Belgian government was in a process of budget cuts and lowering the capital expenditures, as the professor from Universite libre de Bruxelles states:

> *"I think we started in 1982 or 1984 like most Western countries, and since then we have always been trying to decrease the level of expenditure, so you cannot fund your airline if you cut all expenditures" (Professor, Universite libre de Bruxelles 2016 : #1 - 0:17:17)*

Due to these two relations: a lack of support from the Walloon and Flemish region and a general focus on public expenditures could be the reason for no sufficient financial support to Sabena airline. As the professor from Universite libre de Bruxelles states:

> *"My feeling is that from one point they said, okay, no, it's over with Sabena. We will rely on the private market and we see what will happen with the connectivity here in Brussels" (Professor, Universite Libre de Bruxelles 2016: #1 - 0:17:45).*

A motivation or believe that Belgium still would have connectivity was founded on a positive attitude towards the free market and a strong local market due to different international institutions such as NATO and the EU parliament. As the professor from Universite Libre de Bruxelles states:

> *"…with the free market, we would still attract many airlines, and Brussels is still an international city with so many international servants and all the things like that. There is a market in Brussels, and maybe it won't be Sabena anymore, but it will be another airline, and probably with less long-haul flights because it doesn't make sense to have so many long-haul flights for a small country like here, especially if we have so many hubs just two or three hours around Brussels. But that could be possible" (Professor, Universite libre de Bruxelles 2016: #1 - 0:19:04).*

After the collapse of Sabena, SN Brussels airlines was founded by approximately 40 investors, including Brussels Airport, the vice president of media relations of Brussels airlines articulates in this relation:

> *"Then Brussels Airlines was created by about 40 private investors who created the airlines, also the Brussels Airports participated 40 investors they all have very small participation, so nobody had on 35%, 40% share in the new airline. They all contributed to the creation of the new airline" (Vice President Media Relations Brussels Airlines 2016: 0:14:48).*

After the Bankruptcy of Sabena, the newly formed Brussels airlines were only able to optain 20% to 30% market share. This generated a challenge since the development connectivity depends on foreign carriers. This put press even more pressure on Brussels airlines.

> *"Brussels Airlines was between 20% and 30% of Brussels Airport. We have freighter TNT and Liege, same figure, around 30% in cargo in Liege. That is a problem of Belgium. That is the problem of the Belgian airports. They can't count only on the national carrier. So, in order to grow, they are obliged to look abroad and to have foreign carriers. Then, the problem starts because, of course, we need to be open, we need to ensure connectivity, direct and indirect connectivity. But, this is creating also competition against the Belgian carriers. We*

> *could have there, differences. Now, I must admit that the Belgian carrier and the Belgian airports are talking a lot to each other and they try to have not a common view or not a common policy, but at least a policy which is beneficial for everybody" (Belgian Civil Aviation Authority, 2016: 0:20:53)*

One example where the connectivity is depending on foreign carriers is related to connections to Asia and other long-haul destinations where Brussels airline only provide 34% of all departing seats in 2017 (SRS seat data), even though Brussels airlines just opened a new route to Mumbai in March 2017[117].

> *"Brussels Airlines will start a direct connection to Mumbai. But up until now, we didn't have direct connection to Asia done by a Belgian carrier. So, Gulf carriers were an alternative" (Belgian Civil Aviation Authority, 2016: 0:26:34)*

Even though this increased competition can challenge Brussels Airlines, it is also helping them to be more competitive. Initially, when Ryanair operated from Brussels Airport in 2014[118] there was a lot of protest from Brussels airlines, but Ryanair could not be restricted in operating from Brussels Airport.

> *"When Ryan Air announced that they will start activities in Brussels, it was panic. Brussels Airlines went directly to the cabinet of the minister, "We need to stop that. This is not possible. We can't accept that." "Sorry, Ryan Air is a European company. What can we do? If they have slots, they may." … "Finally, the best thing came… What is the best thing that arrived in the system? It is the fact that Ryan Air has begun activities in Brussels in competition with you. You were obliged to react immediately." And they [Brussels Airlines] did, by the way. Their reaction was really, really impressive. They did a really good job. (Belgian Civil Aviation Authority, 2016: 0:28:24)*

One of the debates – along a debate concerning the social dumping – was concerning the feeder network and the ability for Brussels Airlines to maintain their long-haul network due to competitive situation on their feeder network. However, since Brussels Airlines already had a low market share in Brussels Airport, the connectivity at Brussels Airport was already depending on foreign carriers and therefore there was an

[117] Brussels Airlines will close this destination in 7 January 2018 for economic reasons. See: https://timesofindia.indiatimes.com/business/india-business/brussels-airlines-to-stop-mumbai-flights-from-next-january/articleshow/65869777.cms. Located: 25 September 2018.

[118] See: http://www.flanderstoday.eu/business/ryanair-flights-take-brussels-airport-amid-protests

a need for foreign carries to maintain and develop the connectivity at Brussels Airport, as Belgian Civil Aviation Authority states:

> *"That is the debate. It is easier in countries like Germany or Netherlands when your own carrier is representing 60% of your activity. The problem here is that we need to have a balanced view about the own carrier … And the fact that Brussels Airlines definitely need the point to point to feed the local, no doubt about that. And we need to protect that, absolutely. I agree. But, on the other side, as Brussels Airlines only representing one-third of Brussels Airport, can't leave only with Brussels Airlines. They need additional carriers, foreign carriers. The debate is there." (Belgian Civil Aviation Authority, 2016: 0:31:19)*

After the Sabena went bankrupt in 2001, SN Brussels airlines was founded in 2002 on the back of Sabena as stated previously. The new airline did in 2004 join with Virgin Express in the company SN Airholding and formed Brussels airlines. However already in 2008; Deutsche Lufthansa AG purchased 45% of SN holding, and finally in 2016, Lufthansa purchased the residual share to have 100% ownership of SN holding Brussels airline (Brussels Airlines, 2016). The transfer of Brussels Airlines ownership to Lufthansa – a non-Belgium corporations – could raise concerns and promote some kind of actions in order to prevent loss of connectivity due to e.g. reallocation of long-haul routes from Brussels Airport to other Lufthansa hubs. As Belgian Civil Aviation Authority states:

> *"If they just integrate Brussels Airlines within Eurowings point to point, it is a disaster. It is a disaster for Brussels Airlines, it is a disaster for Brussels Airports, because we forget definitively the added value of Brussels Airlines in terms of long-haul, especially in Africa" (Belgian Civil Aviation Authority, 2016: 0:54:50)*

Similar situations happened in the Netherlands after the merger of Air France and KLM and Lufthansa takeover of Swiss. In both countries, commissions were established to secure the national interests (see section: 7.5.1 Policies – Mainport strategy for the Dutch case and section: 10.5.4 Political and Public Awareness for the Swiss case). In 2016, there was no plan within the Aviation Authority to address this potential change in connectivity at Brussels Airport. As s Belgian Civil Aviation Authority states:

> *"We may discuss more of this in advance [Lufthansa purchase of Brussels Airlines]. … What will we do? I don't know. We need a backup. Yes." (Belgian Civil Aviation Authority, 2016: 0:56:10)*

This chapter illustrates that production of aeromobilities in Belgium is influenced by the regional decentral focus on aviation and limited proactive actions from the Belgian government and Belgian Civil Aviation Authority. At the time where Sabena was in financial distress, Wallonia and Flanders did not support increased financial assistance to the Sabena for various reasons, this combined with the focus on capital expenditures within the public sector did limited the financial support from the Belgian government which influenced the bankruptcy of Sabena. At the time of the bankruptcy, there as a strong believe in the market to provide the connectivity to Brussels due to several international institutions such as NATO and the European parliament, this was an additional factors for low political interference in the saving of Sabena. At the Belgian Civil Aviation Authority, there is a perception that the connectivity at Brussels Airport to a large degree is dependent on foreign carries; however Brussels airlines are vital for maintaining the long-haul connectivity. Disregard of this position, there have been no plans to assess the potential change in long-haul connectivity after Lufthansa purchase of Brussels Airlines, as it seen elsewhere in Europe.

9.7 EPILOGUE

In this chapter, I have unfolded the driving forces behind the production of aeromobilities in Belgium and the production of hub airport in Brussels Airport. In addition, I have identified a discourse: *Decentralized production of aeromobilities* based on various practices and articulations, this discourse encapsulates the foundation of aeromobilities in Belgium and is based on a rationality linked to the federal system in Belgium. Last, I will based on the case of Brussels Airport highlight different elements that are relevant for developing a hub airport governance model.

By analyzing my material, I find there are several drivers that consists of a nexus of Policies and Materialities; these have to be understood in relation to each other's for understanding this production of aeromobilities production in Belgium.

Even though the federal government has an interest in developing the connectivity in Belgium, the federal system has significant impact on the development of Brussels Airport, due to a decentralized regional focus. This has led to a limited national or federal focus on developing the federal airport in Brussels. Due to this federal setup, it has been argued that it is difficult and expensive to promote federal financial support to the development of infrastructures related to Brussels Airport, since regions will require additional financial focus. Such a decentralized focus can be seen with the layout of high-speed train stations in Belgium. Even though the high-speed train tracks are running close by the Brussels Airport, it was decided to only build three high-speed stations in Belgium, one in Wallonia, one in Flanders and one in Brussels capital region.

The decentralization process in the late 1980s, led to transferring ownership of the regional airports Wallonia and Flanders. Due to this process, Wallonia began successfully to develop Charleroi airport, which has enforced the regional focus. Along the ownership transfer, it was agreed some of the cost of operating the regional airports still were a federal expense even though Brussels Airport still have to expense these costs. This situation is articulated as an uneven competitive environment that Brussels Airport must face besides the already highly international competitive situation the airport is confronting.

Another driver – or challenge – in developing hub airport in Brussels Airport is based on the location of Brussels Airport and the layout of the runways. Due to noise externalities there are significant protests from local inhabitants, which limits the potential aeromobilities production. This aspect of noise externalities and the regional setup does also manifest in different noise thresholds in Flanders and Brussels Capital Region, resulting in airlines being fined when taking off Brussels Airport and entering the Brussels Capital Region. Even though it has been tried to bridge the interest of the inhabitants and the market back in the early 2000s, it the process ended up in conflicts and the cargo company DHL reallocated to Leipzig.

In the newly suggested strategy from Brussels Airport: *Vision2040,* the airport addresses the controversies between the production of aviation and the noise externalities by engaging different stakeholders in the development plans. There are several parallels to the Alders Table in the Netherlands: such as respected chairman, inclusion of a variety of stakeholders, however, in this case of Brussels Airport, the viewpoints from stakeholders are only input to the development. The airport are not to the same extent bound by the input from the *Forum 2040*, as it is stated that "*The airport makes a commitment to take account of them when finetuning the plan for the future of Brussels Airport" (Brussels Airport, 2017c).*

Finally the bankruptcy of Sabena in 2001, led to losing connectivity from Brussels Airport. As argued, there are several reasons for this bankruptcy, but due to the limited of support from the federal regions it was difficult for the government to prevent the bankruptcy of the Sabena. In addition, there was a market-orientated belief that due to strong international institutions, the market itself would develop the needed connectivity.

Based on this analysis, I will argue for a discourse: *Decentralized production of aeromobilities.* The discourse lays out the foundation for the Policies and Materialities that enable the production of aeromobilities and the making of a hub airport in Brussels. The decentralized focus are linked low federal involvement in aeromobilities and developing of the hub function in Brussels Airport, as articulated in the chapter: "*If we have a policy for the national airports and we create a competitive landscape with the regional airports, we will have institutional problems between the federal government and the regional governments. We must be very*

cautious on this" and "*We have seen a lack of federal aviation policy because the two regions were doing their thing"*. The discourse also frames the development of Brussels Airport. Brussels Airport is by itself addressing the importance of relating to the local environment; the statement from CEO of Brussels Airport: "*For us it is important that this takes place in a balanced approach between the economic development of the airport and the care for our environment"*. In addition, this discourse is also founded in different practices. One example could be the investment plans from Brussels Airport that include proposed investments that are targeting recreational facilities for the public. In addition, the challenge to have a unilateral federal focus on the federal Brussels Airport is also a practice that can be linked to this discourse. Further, the challenge with different noise limits in the Brussels capital region and Flanders region is a practice that can be linked to the discourse: *Decentralized production of aeromobilities*. The rationality behind this discourse is founded in a strong historical development of Belgium based on the federal system.

Due to this problematic situation for developing aeromobilities and the hub in Brussels Airport, I would pinpoint several learnings from this case that in needs to be included in my proposed airport governance model. First, the production of hub airports is complicated and we need to address several aspects both local and national aspect. The challenge of making the airport in Brussels is linked to the regional setup. Therefore, it is important to include this dimension, and have the knowledge that too much decentralized focus can have negative consequences for the development of a hub airport. Another lesson from this case is that losing a strong domestic carrier can have severe consequence for the connectivity to and from the hub airport. One way to counteract such a dramatic development, could be higher political support for the airlines as illustrated in the case of Zurich Airport – however, in this case of Sabena, this was not possible due to the regional setup. Additionally, an airport governance model must also address externalities – such as noise in this case, in order to develop connectivity.

10 CASE – ZURICH

"[The] biggest challenge is capacity, the capacity related to night-bound, to noise, to neighborhoods, and it will be more and more political difficult" (Head of Economic Affairs, FOCA 2016: 0:19:35)

10.1 PROLOGUE

In Switzerland, the production of aeromobilities and the making of a hub airport in Zurich Airport is unfolded in a nexus of local and regional Policies and Materialities. In this chapter, I will analyze these drives and in addition, I have identified a discourse: *Hub aeromobilities on the basis of direct democracy and a market* that encapsulates the production of these Policies and Materialities. Further, I will argue that this discourse is based on a rationality of the federal system in Switzerland.

This discourse is the foundation for Policies and Materialities, that these constitute a nexus of conflict with a neighbor country, regional, local stakeholders, market forces and direct democracy. A critical dimension is the capacity constraints at Zurich Airport, and where the potential capacity expansion is challenged due to the federal system with direct democracy. The critical situation fosters considerations regarding alternative solutions to the generation of aeromobilities; such a higher integration of trains in the aviation system or reallocated airlines operations to another airport. Unfortunately, none of these solutions is costless and long lasting. Further, there is consideration whether or not more growth is at all necessary. The political attention towards aviation is currently rather low, since – as I will argue – there is currently no *burning platform*, as I saw in the cases of Amsterdam and Helsinki. In contrast, back in the early 2000s, where Swissair was in financial distress, the political attention was higher. In order to save jobs and connectivity, there was a political wiliness to provide a loan of more than one billion of CHF to bridge the crisis between the grounding of Swissair in 2011 and the construction in 2002 of the new Swiss International Air Lines (Swiss). The high political attention can also be founded in the establishment of a commission in 2005 that was monitoring the Swiss integration into the airline Lufthansa to secure Swiss national interests.

Even though there is a discourse articulating that aviation is important to society and has to be left to the market forces, this case illustrated further that local, regional and global events together with Policies and Materialities have a strong influence and sometimes challenge this discourse. A particular striking result is how aeromobilities are unfolded in the span of market force and direct democracy.

After I have analyzed this case, I will pinpoint learnings to be considered in developing the model of understanding the Airport Governance model.

10.2 COLLECTING DATA

In the spring of 2016, I conducted interview related to the Zurich case. Before I went to Switzerland, I had the pleasure beforehand in Copenhagen to interview Nico Lalli, senior project leader public affairs, Zurich Airport. At this interview, Nico Lalli introduced me to key elements within the Swiss aviation. In Zurich, I interviewed Marcus Hassler from economiesuisse, a corporate union representing companies in Switzerland. Further, I interviewed Philippe Clapasson, Head of Economic Affairs FOCA[119]. FOCA is the aviation regulator in Switzerland and therefore for Zurich Airport. FOCA is the publisher of Civil Aviation Policy Reports in 2004 and 2016, which I will return to later. In Bern, I interviewed Philipp Hadorn who is Präsident GATA SEV Aviation; a labor union for aviation-related personnel. Philipp Hadorn is also a member of National council the lower house in the Parliament in Switzerland. Due to problems of getting the right contacts to Swiss, I first set up an interview with Gieri Hinnen Head of Labor Relations & HR Steering, Swiss during the spring of 2017. Throughout 2017, I did interview Andreas Wittmer, Managing Director, Center for Aviation Competence, University of St. Gallen. Wittmer had conducted aviation research within Switzerland and he is involved in developing a new aviation research center in Switzerland. My sampling of interviews covers representatives from airports, airlines, regulators, Members of Parliament along with representatives from corporate and labor unions, in line with the approached presented in the Chapter: 5 Methodology Unfortunately, I did not set up interviews with tourism organizations. During my work with my material, I had several questions, which Nico Lalli, the Senior Project Leader of Public Affairs from Zurich Airport help me seek these issues out. Listed below in Table 13 Table 14 are the persons I have interviewed and selected documents I have adressed in relation to the Zurich case.

Interview persons	Title	Company/Organization	Representing
Marcus Hassler	Projektleiter Infrastruktur	economiesuisse	Business
Nico Lalli	Public Affairs	Flughafen Zürich AG	Airport
Philipp Hadorn	Präsident GATA SEV Aviation / Member of National Council	GATA SEV Aviation / National Council - lower chamber of Federal Parliament	Union/State
Philippe Clapasson	Head Economic Affairs	FOCA	Regulator
Andreas Wittmer	Managing Director	Center for Aviation Competence, University of St. Gallen	Academia
Gieri Hinnen	Head of Labor Relations & HR Steering	Swiss airline	Airline

Table 13: Interview persons in relation to Zurich case in 2016.

[119] FOCA is an abbreviation for Federal Office of Civil Aviation – a correspondence to CAA: Civil Aviation Authorities. In German FOCA is named BAZL, which is an abbreviation for Bundesamt für Zivilluftfahrt. FOCA is a sub-division to DETEC and abbreviation for Federal Department of Environment, Transport, Energy and Communication.

Document	Topic	Type/ Year
Civil Aviation Policy Report	Civil Aviation Policy	National aviation policy / 2004
Civil Aviation Policy Report	Civil Aviation Policy	National aviation policy / 2016
Sectoral Plan for Aviation Infrastructure	Spatial planning for Airports	National spatial policy / 2017
Federal Constitution of the Swiss Confederatio	Law	Constitution
Swiss Aviation Commission	Commision to monitor aviation development	Final report / 2015

Table 14: Selected documents I have addressed in order to understand the production of aeromobilities in Switzerland and Zurich.

Based on my interviews with professionals and academics along reading documents and articles, I want to unfold some of the driving forces affecting the development of aeromobilities in Switzerland. Due to the scope of this project, my key focus will be on production of a hub airport in Zurich.

In the Swiss context, there have been published several articles and conference papers. In line with previous literature searched, I have within the largest and oldest aviation journal *Journal of Air Transport Management* only identified one relevant article directly related to Zurich Airport:

"Effects of non-aeronautical activities at airports on the public transport access system: A case study of Zurich Airport". This article is focusing on how landside commercial activities at Zurich Airport increases the feasibilities for public transport to and from Zurich Airport. The article illustrates how landside commercial activities, which can be part of the regulatory economic framework for airports can stimulate a higher number of users of public transport and thereby a more viable economic for the public transport system (Orth, Frei, & Weidmann, 2015).

Additionally, I have located articles, case studies and reports addressing various perspectives of the aviation system in Switzerland. Some of these relate to the reasons behind and the consequences of the grounding of Swissair. Listed below are some examples of various articles.

"Alliance strategy and the fall of Swissair". This article analyzed the fall of Swissair and finds that despite the challenging market conditions after the 9/11 terror attack in New York in 2001, parts of the fall can be associated with a management failure. Swissair expansion strategy: *the Hunter strategy* focusing on expansion by acquiring other European airlines (including Sabena, as addressed in Brussels case) combined with large investments led to the fall of Swissair (Suen, 2002).

"Intangible regional effects of regional airports: A system analysis of Switzerland". In this article, the aviation system in Switzerland analyzed the intangible effects associated with regional airports. The article finds that regional airports contribute the maintaining accessibility to the local region, as relief of national airports, along with

possible medical transport for locals and in relation to winter sports. Further, General aviation traffic and training schools are using these regional airports and they provide access for the tourism industry and local businesses. One perspective the article pinpoints is that there is no coordinating management of these regional networks, which leads to redundancies in the infrastructure (Wittmer & Bieger, 2011).

"A model for measuring airport competitiveness: The case of Zurich Airport". This conference paper focuses on different aspects of a hub airport competition. The authors develop a model based on five main factors: environmental factors, demand factors, managerial factors, facility factors and service factors. Based on comparative analysis including seven European hub airports, Zurich Airport is ranked as number five. The article concludes that the competitive position is influenced by runway capacity restrictions and noise regulations that affect opening hours. Due to these constraints, Zurich Airport is facing a challenging competitive situation in the future (Linden, Feltscher, & Wittmer, 2017).

The articles I have found about aviation in Switzerland are mostly in line with the conventional perspective on aviation as I have addressed in section: 2.3 Conventional Aviation Research. Some of their findings related to capacity restrictions in Zurich Airport is also an element I will address in this chapter, but my analysis will try to understand the drivers behind this challenge along other with Policies and Materialities and the underlying discourse for these.

In the next section, I will elaborate on the historical development of Zurich Airport and its connectivity. Later I will unfold the driving forces behind the production of aeromobilities and making a hub at Zurich Airport.

10.3 HISTORY OF ZURICH AIRPORT

The construction of Zurich Airport was initiated in 1946 after the Second World War. The new airport is in the area of Kloten 11 km north of Zurich city replacing Dübendorf airport as a civil airport of Zurich. The inauguration of the airport took place in 1953 after runways and passenger terminals were constructed. In the second phase, runways were extended, the runways now have the length: R 10/28 at 2.5 km and R 16/34 at 3.7 km. Later in 1971, a new runway: R14/55 was constructed. The airport gradually was extended with new terminals, underground train stations and landside infrastructure throughout the 1970s. In the mid-80s Terminal A and a new tower were inaugurated. In 2003 the Terminal E was constructed and in 2018/2019 the new landside real estate: The Circle, will be opened with commercial activities (Flughafen Zürich AG, 2013) Senior Project Leader Public Affairs, personal communication May 9, 2016).

Figure 28: Location of Zurich and Dübendorf airports located 11 km North of Zurich and 8 km Northwest of City of Zurich (Google Map, 2018i)

Zurich Airport is connected to highways linking to other parts of Switzerland and with direct trains to most important cities in Switzerland. Besides the passengers to and from the airport, the landside infrastructure landside is an important connection point for passengers using public transport. In 2013 there were in 24.8 million users of public transport to and from the airport and 7 million of these used the facilities at the airport as transfer point between different modes of public transport such as buses, trams and regional, national and international trains (Senior Project Leader Public Affairs, personal communication May 17, 2016)

The Zurich Canton owned the initial Zurich Airport, but in 1999, the Zurich Cantonal Council wanted to privatize the airport, and after a local referendum in 1999, the privatization was ratified. In April 2000, the new private company Unique was listed on the Swiss Exchange, later in 2009 the name Unique would no longer be used, instead, the airport will be operated under the name: Zurich Airport (Flughafen Zürich AG, 2013). Currently, the company Zurich Airport Ltd. owns and operates Zurich Airport and eleven other airports in six countries. Its main shareholders are Canton of Zurich (33.3% + 1 share), City of Zurich (5%) and the rest is in free floating with a max of 5% voting rights (Senior Project Leader Public Affairs, personal communication May 9, 2017, and 21 December 2017). Zurich Airport Ltd. has the

commission to operate the international airport in Zurich. This commission was renewed in 2001 for further 50 years (FOCA, 2017b).

10.4 ZURICH CONNECTIVITY

In this section, I will generate an overview of the connectivities in Zurich Airport and Switzerland. The aviation system in Switzerland consists of three national airports, 9 regional airports and several smaller local airports and airfields, as illustrated on the map below.

Figure 29: Airports and airfield in Switzerland (Federal Statistical Office, 2016, p. 5)

In Switzerland, there are three national airports[120]: Zurich, Basel-Mulhouse and Geneva, 11 regional airports and more than 70 airfield/heliports (Federal Statistical Office, 2016). After the 9/11 2001 terror attack in the US and the grounding of Swissair in 2002, there was a decrease in passengers until 2004 where the number of passengers increased again. From 2003, there has been a steady growth rate in the number of passengers, only stopped by a small decrease in growth rates in 2009 because of the financial crises. Due to lack of data the section below will only focus on airports with scheduled traffic: Zurich, Geneva, Basel, Lugano, Bern, St. Gallen–Altenrhein and Sion airports.

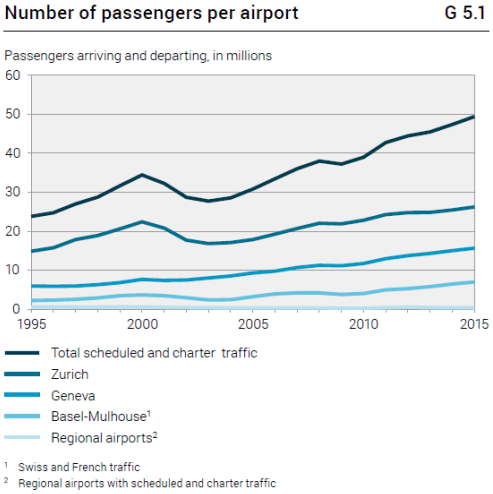

Figure 30: Development of total passengers in Switzerland 1995-2015 (Federal Statistical Office, 2016) [p. 15])

In addition to the coming elaboration of the traffic and connectivity development - see Appendix F. Case of Zurich Airport, for graphical presentation of major traffic trends. The overall departing seat capacity in Switzerland was in 2017 35.7m which is a CAGR increase of 3.5% since 2008. In total 4% of all departing seats are for domestic destinations, 80% are for European destinations and 16% are for long-haul destinations. In 2017, Zurich Airport was the largest airport with 55% of all seat capacity, while Geneva airport had a share of 32% and Basel had a share of 12%. In Zurich Airport Swiss is the largest carrier with a share of departing seats of 53%, while the second largest carrier is Edelweiss Air (wholly owned by Swiss) has 5%. In Geneva Airport, the largest carrier is easyJet with 39% of all departing seats, and Swiss is the second largest with 14% and British Airways with 5% in 2017. Basel Airport easyJet is the largest carrier with 59% and Lufthansa and British Airways with respectively 7% and 4% of all departing seats (SRS seat data).

In 2001 Swissair was grounded due to financial problems – as I will return to later – however this has significant consequences for the passenger level in Zurich Airport

[120] See: (FOCA, 2004, p.1834]

as illustrated in Figure 30. The decrease in passenger continued until 2004, with a total decrease of 5.4 million annual passengers or 24%

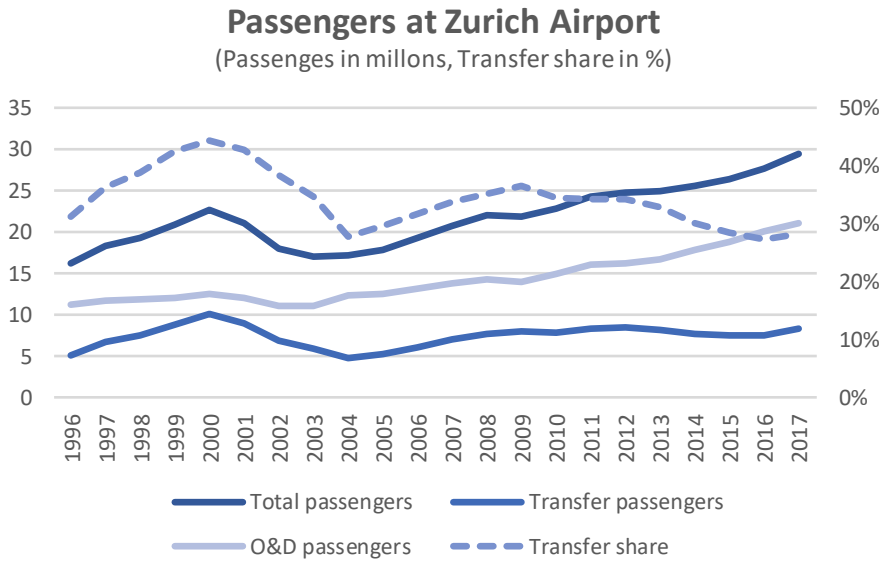

Figure 31: Development of passengers at Zurich Airport, after the grounding of Swiss in 2001, the passenger number decreased for four years with a total decrease of 5.4 million passengers or 24% in relation to year 2000. (Zurich Airport, 2001; Zurich Airport, 2005; Zurich Airport, 2009a; Zurich Airport, 2013; Zurich Airport, 2018a)

In 2017, Zurich Airport had 29.4 million passengers, and a transfer share of 28% (Zurich Airport, 2018a). Of these 3% are for Domestic destinations, 75% are for European destinations, 22% are for Long-haul destinations, where North America share is 35%, and Asia is 29% (SRS seat data).

As a hub function, Zurich Airport had a significant drop in transfer passengers after the grounding of Swiss airline in 2001, however since then the level of passengers increased toward 2009, where after the trend leveled out. From 2010 to 2017, the level of transfer passengers has increased by 0.4 million, which is an increase of 5% over the period. In 2017, there was a transfer share of 28%, which is a decrease since 2009 where it was 37%. Swiss is the main hub carrier at Zurich Airport with 89% share of all transfer passengers (MIDT data). The hub function in Zurich Airport can be evaluated by from where and to where passengers are transferring. In 2010, 46% of transfer passengers were transferring from a European origin to a European destination e.g. a passenger coming from Sweden, transferring in Zurich towards Italy. This percentage has decreased to 39% in 2017. The transferring traffic from Europe

to long-haul destinations, was in 2010 50% and in 2017 55%. The residual percentages are long-haul origins transferring to long-haul destinations, which are less than 5% of transfer passengers (MIDT data)[121]. This illustrates that there is a relatively shift in the transfer function at Zurich Airport where the share of Europe to Europe transfer is decreasing and a relative large proportion is now transfers from Europe to long-haul.

By evaluating the connectivity by the NetScan model (see: 5.4 Analytical Process) the overall connectivity from Zurich Airport have throughout a decade from 2008 to 2017 had an increase in *Airport connectivity* by 24%, however only 6.5% is generated by *Direct connectivity*, while the *Indirect connectivity* has increased by 32%. This indicated that the Zurich Airport has had an increase of accessibility, but a significant part of this increase is generated by an increased connections to other airport hubs. The Hub connectivity from 2008 to 2017 have increased by 14% - this is in line with the development of transfer passenger development (ACI Europe, 2014; ACI Europe, 2015a; ACI Europe, 2016; ACI Europe, 2017a).

As illustrated domestic travel constitute 4% of all departing seats in Switzerland, this can be associated with the different functions the remote airports have in Switzerland. Wittmer did analyze these regional airports and found they have an important function as a local facilitator for international and national connectivity, along with functions such as pilot training, medical support, enable for tourism, etc. (Wittmer & Bieger, 2011, p. 348).

In contrast to other Swiss airports, Basel-Mulhouse is special since it is actually in France close to the Swiss border. The airport is located 20 km from Mulhouse and only 5 km from Basel in Switzerland. The airport was inaugurated in 1946 and the setup for the airport is based on a treaty between France and Switzerland where France provided the land, while Switzerland paid for the cost of the infrastructure. The airport is a French airport for France and a Swiss airport for Switzerland, therefore the airport actually has three IATA codes, one for the French airport: MLH, one for the Swiss airport: BSL and one neutral code: EAP (Hill, 1992).

After a short brief of the aviation distribution in Switzerland, I will now focus on Zurich Airport and on what the driving forces are for this airport.

[121] The split of transfer traffic into transfer traffic between Europe/Europe and Europe/long-haul destinations are based on origin and final destinations. By this, e.g. if a 2nd transfer is taking place at another European airport for travel to US, the transfer in Zurich Airport is labelled as a Europe/long-haul destinations transfer. Even though the first airport after Zurich is European. This potential mis-interpretation may only relate to flight paths with more than one transfer airport. In the case of Zurich Airport (2017), 13% of all transfer traffic did transfer at another airport before or after Zurich airport (MIDT data). See also Appendix A. Connectivity Data.

10.5 THE POLICIES DIMENSION

10.5.1 THE POLICIES OF AVIATION IN SWITZERLAND

This section will elaborate on the different policies related to the production of aeromobilities in Switzerland and the making of making hub airport in Zurich. In the sections below, I will analyze the Civil Aviation Policy Reports published by FOCA that articulates federal view on the aviation industry and Sectoral Aviation Infrastructure Plan also published by FOCA. This plan defines the layout of the spatial development of Zurich Airport in relation to runways and formulates noise thresholds. Next, I will highlight the paragraphs in the Cantonal Aviation Act that state the approach towards aviation in the Zurich Canton, this act expresses a focus on noise externalities from Zurich Airport. Last, I will argue for a current low political attention towards aviation.

10.5.2 CIVIL AVIATION POLICY REPORTS

In the next paragraph, I will comment on the latest two Civil Aviation Policy Reports (CAPR)[122]; one in 2004 and the latest one in 2016. The focus of the two reports is different due to the given contextual situations. There were also aviation reports, one in 1953 published by the Federal council and one in 1980 published by FOCA, but I could not locate these reports (FOCA, 2004, p. 1788). The Civil Aviation Policy Report is formulated by FOCA and is linked to the Sectoral Plan for Aviation Infrastructure (SPAI)[123], which lays out the foundation for the infrastructural development for aviation (FOCA, 2004, p. 1788). I will later return to the SPAI.

10.5.2.1 Civil Aviation Policy Report 2004

The Civil Aviation Policy Report 2004 recognize aviation as of great economic importance both due to the industry itself but also for the whole country. The driver for this economic benefit is optimal connection between Switzerland, Europe and world centers (FOCA, 2004, p. 1782). The world centers are specified by the Senior Project Leader of Public Affairs of Zurich Airport stating: "*that we [Zurich Airport] have to offer the infrastructure to make sure that Switzerland is connected directly by*

[122] These Civil Aviation Policy Reports are in German named "*Bericht über die Luftfahrtpolitik der Schweiz 2004*" (Lupo 2004) and "*Bericht über die Luftfahrtpolitik der Schweiz 2016*" (Lupo 2016). There are no English publications of the reports, to increase the readability for me as non-native German speaker, I have used Google translate to ease my understanding. When I quote elements from the reports, I have checked the sentence(s) by reviewing both the original German part and the English translation.

[123] Sectural Plan for Avation Infrastructure (SPAI) is in German called Sachplan Infrastruktur der Luftfahrt (SIL).

direct flights to the world's most important business capitals" (Senior Project Leader Public Affairs, Zurich Airport, 2016:45:40)

This is an important articulation since it set the direction for aviation and the making of hub airport in Zurich that focus on business segments instead of key location for leisure traffic.

Overall, the Civil Aviation Policy Report 2004 considered multiple aspects of aviation in Switzerland. Besides the recognition of the economic benefits of aviation and the need to be efficient and have high quality. An important issue is that safety is in focus due to the liberalization. I will next return to this safety aspect two paragraphs below. Further, the report states that the hub in Zurich is important for the connectivity in Switzerland and the hub must be competitive. Additionally, the report states that the airline Swiss (the successor to Swissair) is important: *"Swiss International Airlines AG still is important in respect to aviation policy*[124]*"* (FOCA, 2004, p. 1782). Finally, the report stresses that the federal government leaves connectivity in Switzerland to the market forces. This last comment is also an interesting articulation, since – as I will show later – this remark will be articulated in several interviews.

The focus on market forces stated here in the Civil Aviation Policy Report 2004 is in line with the revision of Federal Aviation Act of 1997. In line with liberalization processes in Europe in the later 80s and 90s, the state interference should be reduced to a minimum. There should be no subsidies for airports, the monopoly of Swissair should be abolished and no stated aid to Swiss aviation school (FOCA, 2004, p. 1794). (see: also section 2.3 Conventional Aviation Research)

As referred to above, there is a focus on safety and an articulation focusing on relatively new airline: Swiss as vital for aviation in Switzerland. These focal points are a consequence of the grounding of Swissair and air accidents related to Switzerland; a crash of Swissair aircraft at Halifax, Canada (September 1998) and two crashes of Crossair aircraft at Nassenwill, Switzerland (January 2000) and at Basserdorf, Switzerland (November 2001). Further, there was a mid-air collision between two aircraft over the south of Germany, where the Air Navigation Service of Switzerland was framed as part of the systematic causes[125] (FOCA, 2004, p. 1782).

After these events, the government of Switzerland had two reports made; the reports concluded that the current safety systems did not comply with IATA recommendations for safety. Further, there was an acknowledgment in these reports that due to the grounding of Swissair, the education system for future aviation professionals no longer existed, since it had been a setup within the Swissair

[124] Own translation of: "*Die Swiss International Air Lines AG stellt auch künftig einen wichtigen luftfahrtpolitischen*" (FOCA, 2004, p. 1782].

Corporation. The Managing Director, Center for Aviation Competence, University of St. Gallen, also states these focal points:

> *"There was a safety report demanded from the NLR the dutch agency just made a safety management report for Switzerland. The government of Switzerland made the aviation political report, that was FOCA – those two reports was basically than used to set up new policies. Major findings were: Aviation law in Switzerland was not up to date, did not match requirement from IATA; the director had to leave and a new one was employed, because he did not do his job properly enough controlling the aviation to keep it safe. The second point was that Swissair was the main educator, they did it them self within the company, when* Swissair *went bankrupt there was not education plan where aviation people could be educated: pilots or managers. (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:09:50)*

These developments with attention on safety illustrates that the development of aviation policies are not straightforward, but a consequence time and space as stated in: 4.3.1 Dynamic Causalities and Verstehen.

In 2001, Swissair was grounded due to financial difficulties at Swissair Group[126]. In the *Civil Aviation Policy Report* 2004, the grounding was explained by the growth strategy – known as the Hunter strategy – combined with the increased competition due to the liberalization of aviation across Europe. Finally, the collapse of the aviation market due to 9/11 2001, led the final grounding of Swissair in 2002 (FOCA, 2004, p. 1795). There are several reports and papers about the grounding of Swissair and they have pointed towards additional problematic issues. Disregard of the different external factors that could have caused the grounding of Swissair, the Managing Director, Center for Aviation Competence points out that the key reason behind the Swissair grounding was that the management failed; they did not understand how aviation work, as he states:

> *"Swissair grounding for was a big management failure it was a corporate management failure. It was clearly management that failed big time – they did not understand how aviation worked" (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:10:09)*

[126] Swissair Group or SAirGroup did consist of: Swissair and Swissair associated companies, such as Gate Gourmet (catering) and Swissport (ground handlling) etc. (Meyer, 2017, p. 100]

After Swissair was grounded [127], the federal government supported the company with a total loan of CHF 1.17bln to the new airline construction with Crossair that took over most of Swissair's assets and was renamed as Swiss International Air Lines (FOCA, 2004, p. 1795). In 2007, Lufthansa had conducted a full takeover of Swiss International Air Lines, and the airline is now part of the Lufthansa group (Swiss International Air Lines Ltd, 2005).

In the *Civil Aviation Policy Report 2004* it is stated: "*Tens of thousands of jobs and the position of Zurich Airport as Hub for intercontinental air transport were in acute danger*" (FOCA, 2004, p. 1795), and because of this the Federal Council gave this loan to prevent Swissair to go bankrupt.

It can be discussed whether this public intervention is in line with the later statement in the *Civil Aviation Policy Report 2004*, where it is explicitly stated that the aviation sector must operate on market conditions. However, the purpose was not to save the company but to save jobs, about 20,000 employees in Zürich. As the Head of Economic Affairs, FOCA states:

> *"It was the social help to the company. It was not the goal to have a Swiss company. It was a goal to save the jobs. … It was an emergency action … It was not a desire of the government to own a company." (Head of Economic Affairs, FOCA 2016: 0:21:01)*

The grounding of Swissair was a significant challenge for Switzerland for several reasons including connectivity and jobs. These important factors led to a practice with a governmental intervention that are in direct opposite the later aviation strategy that are focusing on pure market condition.

10.5.2.2 Civil Aviation Policy Report 2016

The current *Civil Aviation Policy Report* was published by FOCA in 2016. This report is founded in a context where aviation growth is a challenge. This is different compared to the report in 2004 that was a response to a critical situation within the aviation situation in Switzerland. As the Managing Director, Center for Aviation Competence states:

> *"The strategic question is not the same any more – it is not like turn-around management any more for the industry. Now it is about how to managing performance - now it is about where to set the limits and*

[127] It is important to point out that Swissair did own 49.5% share of Sabena airline, the national carrier in Belgium and its bankruptcy is related to the financial distress of Swissair (See: section 10.6.4 Swiss and 9.6.3 Development of Sabena and Brussels Airlines).

> *where to go - so it was needed to again to have a bit of a policy from the government." (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:12:54)*

The *Civil Aviation Policy Report* 2016 recognize aviation as key for Switzerland since aviation secures a connection to Europe and the world. The report estimates the economic impact to be almost CHF 10bln measured in direct and indirect effects (see section: 2.4 Field of Aviation and Airport Research). The goal of the aviation sector is to ensure a framework that ensures the connectivity of Switzerland. Further, the externalities must be counteracted by coordination of air traffic development and urban development, this includes the relation between airports and surroundings (FOCA, 2016a, p. 1851). Swiss airline has a special meaning in the aviation of Switzerland since the airline creates numerous direct routes to major centers worldwide (FOCA, 2016a, p. 1852). As without Swiss operating as hub carrier at Zurich Airport the connectivity will decline – especially on long-haul destinations. (FOCA, 2016a, p. 1853). This illustrates the acceptance of Swiss as an important element in the aeromobilities system.

The focus on Swiss is interesting since the company is now in healthier condition and part of Lufthansa Group, compared to the situation prior to the publication of the Civil Aviation Policy Report 2004. Head of Labor Relations & HR steering atSwiss points out that the focus on Swiss in the 2016 report now is more based on an economic liberal mindset (Head of Labor Relations & HR steering, Swiss 2016: 0:21:57)

Further, in the *Civil Aviation Policy Report* 2016, it is emphasized that the open economy in Switzerland lies on liberal traffic rights since the competition between Swiss airlines and foreign airlines are important for secure connectivity with attractive prices for the benefit for the consumers (FOCA, 2016a, p. 1853). Gulf carriers[128] can produce connectivity at favorable conditions due to the location of their home base and financially strong owners. Consequently, European airlines and Swiss will therefore lose market shares. Even though this potential risk for by Swiss airlines, Switzerland has limited opportunities to counteract. An abandon from the liberal approach to traffic rights would have negative consequences for the Swiss society (FOCA, 2016a, p. 1853). The aviation policy therefore must focus on improvement for the framework for Swiss companies; this includes competitive and efficient airports with attractive opening hours. *Civil Aviation Policy Report* 2016 stresses there is a need for special attention towards ownership and control of Swiss airlines to prevent non-EU airlines to gain access to the liberalized European market. (FOCA, 2016a, p. 1853)

In relation to the focus on Swiss in the Civil Aviation Policy Report 2016, the Managing Director, Center for Aviation Competence Center, states that Swiss is no

[128] Gulf carriers are typical listed as: Emirates, Etihad Airways and Qatar Airways

longer that important, the most important is to secure the hub function in Zurich Airport.

> *"Forget Swiss. In every second sentence, you write Swiss [in Civil Aviation Policy Report 2016], who cares about Swiss, who cares if Swiss operates a hub in Zurich or if it is Emirates or Etihads. Who cares! In the end it is the airline that operates the hub, but what brand there is on the airlines that doesn't really matter - we have to make sure we have that hub, but the brand on planes is completely irrelevant" (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:20:26)*

The lesser focus on Swiss is stressed by the Head of Economics Affairs at FOCA:

> *"Our goal is to give preference to the connectivity, but we don't choose who has to fly this connectivity. For us, the traffic rights are very important. We have to allow all the companies to fly from Switzerland to everywhere. And then the company decides, I want to fly to there. We do not ask to say Swiss or Lufthansa or Emirates, I want you to fly from Zurich to Hong Kong. Free market; and they operate as private companies in the free market." (Head of Economic Affairs, FOCA 2016: 0:12:36)*

This less focus on Swiss is also articulated by the Head of Economic Affairs, FOCA, who states:

> *"It's not important who is flying, we just need a connection [e.g.] between Zürich and Shanghai." (Head of Economic Affairs, FOCA 2016: 0:38:28)*

There are slight conflicting articulations regarding the importance of Swiss, on one side, Swiss is important to the hub for Zurich, but on the other sider there are articulations focusing less on Swiss and the market to rule.

The conflict could be encapsulated by the fact that all that parties agree that the hub of Zurich is important; the challenge is just who to operates it. Currently, there is no obvious alternative to Swiss, even though the liberal mindset articulated among stakeholders have less focus on Swiss. The challenge is how to correspond to Gulf carriers that have better foundations for competing. The response is not to intervene directly, but to improve the framework for Swiss aviation companies so they can compete on a level playing field.

Regardless of this focus on market forces, there is an attention towards an improvement framework for Swiss airlines and special attention towards potential international competition. And as

To sum up these arguments; basically, there is a consensus in the Civil Aviation Policy Report 2016 and among the managing director, Center for Aviation Competence and the head of economic affairs, FOCA that aviation needs to be handed to the market forces. However, too much influence from foreign airline companies needs to be counterbalanced by improvement of the framework conditions for Swiss airlines. These could point towards a discourse focusing that aviation needs be driven by market forces, but only as long as it is with in a level playing field[129] for all parties.

Civil Aviation Policy Report 2016 stated there is a capacity challenge in all three national airports. A solution in Zurich Airport could be an expansion of runway capacity. The largest challenge to accommodate this expansion is the populations' acceptance. The Head of Economic Affairs, FOCA, also addressed this capacity challenge:*"Biggest challenge is capacity, the capacity related to night-bound, to noise, to neighborhoods, and it will be more and more political difficult" (Head of Economic Affairs, FOCA 2016: 0:19:35)*

The Managing Director, Center for Aviation Competence has a strong opinion regarding the capacity issues in Zurich Airport and the challenge of solving the conflict due to direct democracy:

> ***"****That is true [there is a capacity issue in Zurich Airport), that is also homemade – I mean your build 3 runways that cross each other your have a homemade problem. You have 3 runways, but a capacity of about 1.3 runways – I mean it is just bad architecture! And that is historical wrong and we can't change it any more, why can we change it because the local people don't want – that is the negative effect of a direct democracy. In this case in Switzerland it is only the people living in the state of Zurich that can vote when it is about the airport, because the airport is on the ground of the state of Zurich and belongs to Zurich – it is not the central government airport, it is a Zurich Airport and by this Zurich people decide. And as you could imagine the closer you are to the airport the more your decision is*

[129] Level playing field refers to fair competition. This is a difficult issue to assess since such as debate includes debating production elements for airlines such as geographical location, labor cost, fuel cost, infrastructure, safety and taxation (Tretheway & Andriulaitis, 2015, p. 98-99]. These factors are not equal either a cross the World or even within Europe.

> *influenced by noise."(Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:44:01)*

The issues with capacity problems at Zurich Airport can be difficult to solve due the ownership structure, which sooner or later will lead to a referendum due to the direct democracy, in that way it will be the inhabitants living close to the airport that vote for or against an expansion of the runway capacity. Later in the section: 10.6 The Materialities Dimension addresses the challenge related to the location of Zurich Airport, surrounded by mountain terrain, close to Zurich and less than 20km from the German border, which has large influence on the potential development of Zurich Airport. Before I will address how capacity in Zurich Airport is regulated by the Sectoral Aviation Infrastructure Plan, I will briefly address research within aviation and how stakeholders are involved in the Civil Aviation Report.

10.5.2.3 Research Within Aviation

An important development within the aviation in Switzerland is the new focus on aviation research. Previously this is addressed in the Civil Aviation Policy Report 2004, but in 2016, specific actions were taken to promote these kinds of activities. Civil Aviation Policy Report 2016 states: "*A strong Swiss research center is of great importance for aviation*" (FOCA, 2016a, p. 1931). There will be a central coordinating organization: "Swiss Aviation Research Center" that constitutes of four universities that are to coordinate aviation research activities in Switzerland. *"It works inter-disciplinarily and is very well connected to the aviation industry by the existing institutes at the four universities."* (FOCA, 2016a, p. 1931).

As the Managing Director, Center for Aviation Competence states:

> *"What is new is that is says Switzerland should be world known place for its aviation research and education So the government had said that we should deliver top-research on the global scale and education. We should be the benchmark" (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:14:10)*

To have a national focus on aviation from a research perspective can be seen as a practice that supports a discourse with an acknowledgement of aviation as important for society and in order to prevent similar challenges as with the grounding of Swissair

10.5.2.4 Stakeholder involvement in Civil Aviation Policy Report

Formulating the Civil Aviation Policy Report is based on input from various stakeholders such as the Swiss airport, airlines, industry and tourism representatives. As Projektleiter Infrastruktur, economiesuisse states:

> **"***Swiss airline, I mean. Yes. Some of the users, like the industry, the exporters. Tourism industry. It was a rather small group because it is a very specific field of policy. It is important for everyone but no one really knows. Yes, but that was kind of…from my perspective…a very good and valuable output we could do in the whole process of elaboration of this whole new strategy. (Projektleiter Infrastruktur, economiesuisse 2016: 0:30:54)*

Beside these different stakeholders, the Aerosuisse[130], did significantly contribute to formulating the Civil Aviation Policy Report, as the Managing Director, Center for Aviation Competence states:

> *"Aerosuisse is a major association where most of the companies in aviation are member of it has a function to lobby the politicians for the aviation industry … they basically create aviation policies and aviation politics and help the government what the aviation industry thinks and feels like concerning policies - so this is kind of a big steering mechanism" (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:18:33)*

The challenge with too much involvement from multiple stakeholders is that the result is a compromise between stakeholders, as Projektleiter Infrastruktur, economiesuisse states:

> *"There is not really someone who can come up with a strategy and then go and implement because there are too many voices who have a stake in this whole situation." (Projektleiter Infrastruktur, economiesuisse 2016: 0:18:44)*

He further articulates:

> *"I don't see how we are going to solve this whole stakeholder issue … In Switzerland, we are very wealthy, very rich, so we become a little bit lazy. We think that the money is falling down from the sky" (Projektleiter Infrastruktur, economiesuisse 2016: 0:56:55)*

[130] Aerosuisse is an umbrella organization for more than 140 Swiss aviation industries and organizations (Aerosuisse, 2017).

As a result, the Civil Aviation Policy Report have difficulties in addressing and prioritize some of the key issues such as the capacity challenges in Zurich Airport.

> *"They [FOCA] have written a lot of good things in here, but they haven't really made a really good analysis about what is the problem and the challenges and what we should include and what are the different aspects we have to have on an eye. But, the problem is probably, if I can put it like this, it is not a strategy, because it is not a priority or prioritization of goals of actions and what else. It does not reflect the political decision of "Okay, we are going to do it like that now. Step One, Step Two, Step Three." It is more a picture of the situation, what is important, blah, blah, but it is not really a prioritization. … I think the whole process has to go on. This is nice we have it, but the real fights are coming on the lower level when we are discussing about planning instruments for the airport. (Projektleiter Infrastruktur, economiesuisse 2016: 1:05:24)*

The reflections from Projektleiter Infrastruktur, economiesuisse, illustrates an important aspect of aviation; it is a complicated area with many voices that pulls in different directions.

10.5.3 SECTORAL AVIATION INFRASTRUCTURE PLAN

FOCA presents the *Sectoral Aviation Infrastructure Plan*[131] (SAIP) to set binding targets for infrastructure and requirements related to aviation infrastructures in Switzerland. SAIP consists of a general concept for the network of airports and their functions, but also an objective for each airport in Switzerland. The objectives for Zurich was formulated in 2000, and since then there have been a process for formulating objectives for the other airports in Switzerland (FOCA, 2017a).

In relation to Zurich Airport, SAIP defines the spatial planning for runway layouts and noise limits for aircraft operations, and therefore it defines flightpaths for aircrafts operation at the airport. Consequently, the SAIP defines the maximum number of aircraft movements per hour and by this the capacity at the airport (Senior Project Leader Public Affairs, personal communication December 21, 2017).

The first objective for Zurich Airport was established in 2000, but due to a treaty between Switzerland and Germany at the end of September 2016 related to flight operations over Germany, the objective had to be updated in 2017 to cope with the treaty (FOCA, 2016b). One implication of the treaty is the need for new flight paths

[131] The Sectoral Plan Infrastructure of Aviation in German is named: Sachplan Infrastruktur der Luftfahrt or in short: SIL

for aircraft approaching and taking off Zurich Airport. To facilitate these new flight paths and in order not to decrease the current capacity an extension of runway 28 and 32[132] is needed for all types of aircraft to operate safely and regularly (Senior Project Leader Public Affairs, personal communication December 21, 2017). However, such change in infrastructure must be accepted by the Zurich Canton, and this process is not a straightforward process, as I will address in section: 10.6.2 Capacity – a Consequence of Direct Democracy.

The current SAIP updated 2017 – called SAIP 2 – addresses the current challenge, but of long-term solutions to capacity challenges – which is recognized in the Civil Aviation Policy Report 2014 – is not solved by the latest SAIP 2. As Zurich Airport states on their webpage:

> *"As a planning instrument, the SAIP should actually present development opportunities for the next twenty years. In the LUPO [or SAIP], the Federal Council regards the limited infrastructure for scheduled and charter service as the biggest challenge of the future. Yet the SAIP presents no solutions as to how projected air traffic demand should be handled over the long term" (Zurich Airport, 2017b)*

This new revision of the SAIP 2 illustrates – or at least from Zurich Airport's point of view – that the problem with capacity still exist and there are no quick fixes right now.

Due to the lack of political intentions or possibilities to address solutions for the long-term capacity issues at Zurich Airport, the process must be handled within the federal system – which includes local referendums as stated in the previous section[133] – and the associated legal system, a process that could last 15-20 years. As stated by the Senior Project Leader of Public Affairs of Zurich Airport:

> *"When we say as an airport, we need a third runway, for example, then you go through the political discussion first, you go through all those legal discussions, you go through all the legal instances, until the end you go to federal court who files the final decision. And then you need to build it because you're probably not going to be allowed to start building before a final decision has been taken. This takes*

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[132] See: https://www.bazl.admin.ch/bazl/de/home/sicherheit/infrastruktur/flugplaetze/landesflughaefen/flughafen-zuerich/sil-prozess-flughafen-zuerich/sil-objektblatt-geplante-anpassung.html

[133] "In this case in Switzerland it is only the people living in the state of Zurich that can vote when it is about the airport" quote by **(**Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:44:01)

> *15-20 years." (Senior Project Leader Public Affairs, Zurich Airport, 2016: 0:41:59)*

Even though the as the overall competence for developing aviation in Switzerland is a federal responsibility (The Federal Council, 2017, art. 87), the partial ownership of Zurich Airport by the Canton of Zurich with 33% of shares + 1 gives the canton of Zurich the blocking minority right in relation to new runway constructions and modification of operational restrictions. The Cantonal Aviation Act articulates that developing Zurich Airport must balance in respect to externalities as stated:

> § 1. *The state promotes Zurich Airport to safeguard its national and economic interests. Taking into account the protection of the population from the harmful or annoying effects of airport operations*[134].

Further, The Cantonal Aviation Act states that Zurich Airport will not suggest runway modifications and operations regulations if it increases the noise externalities:

> § 10. *The Company ensures that, without the consent of the State representatives on the Board of Directors, no requests to the Federal Government regarding changes in the location and length of the runways and requests for changes to the regulations operating that have impact on the aircraft noise exposure can be resolved*[135].

This section illustrates several points in relation to the production of aeromobilities in the Switzerland and the making of a hub airport in Zurich. The SAIP from the federal government stipulates the overall spatial planning and layout of runways in Zurich Airport. However, due to the federal system and the ownership structure of Zurich Airport the needed expansion or modification of runways are a challenging process and is estimated to take up to 20 years including a referendum by the locals in the canton for Zurich.

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[134] Own translation of: "§ 1 *Der Staat fördert den Flughafen Zürich zur Sicherstellung seiner volks- und verkehrswirtschaftlichen Interessen. Er berücksichtigt dabei den Schutz der Bevölkerung vor schädlichen oder lästigen Auswirkungen des Flughafenbetriebs"* (Canton Zurich, 2016)

[135] Own translation of: "*§ 10 Die Gesellschaft stellt sicher, dass ohne Zustimmung der Vertretung des Staates im Verwaltungsrat keine Gesuche an den Bund über Änderungen der Lage und Länge der Pisten und Gesuche um Änderungen des Betriebsreglementes mit wesentlichen Auswirkungen auf die Fluglärmbelastung beschlossen werden können*" (Canton Zurich, 2016)

10.5.4 POLITICAL AND PUBLIC AWARENESS

In this section, I will argue that the political awareness towards aviation is not as high as in the days where Swissair was grounded and later integrated into the Lufthansa Group.

Unfortunately, this support for aviation in Zurich was gradually reduced over time due to the ecological focus and the fact that people forget that some of the foundation for this economic prosperity was based on aviation and the associated externalities.

> *"This [positive attitude aviation] continued until the '70s … I think it was the ecologic kind of mind change that happened where the whole CO_2 and noise and everything … and people started to critically ask themselves is flying around a good thing or not and how much does it contribute or help us to develop? And then I also think that because Switzerland did pretty well economically and was pretty rich, that people forgot that growth and development of infrastructure and everything is very important for a strong economy." (Senior Project Leader Public Affairs, Zurich Airport, 2016:17:22)*

These are interesting statements that articulate that the focus on environment and the current comfortable situation has lowered the interest of developing aviation and the risk to accept the associated externalities. This decrease in fascination could also be linked to increased externalities and terrorism: As Roseau states:*"The 1970's, when aviation entered the era of mass transport, witnessed the beginning of a chronic crisis in aviation and its infrastructure. The arrival of the Jet Age, growth in traffic, complex new procedures, oil price shocks, environmental degradation, and terrorism all undermined the model of the perfect showcase airport and made apparent the issue of uncertainty as a key component in the airport development equation"* (Roseau, 2012, p. 44)

This paragraph illustrates that there are some stakeholders to aviation that view have been a decrease in public appreciation towards aviation.

Along with this decreased public appreciation towards aviation, the political awareness of aviation has also declined since the grounding of Swissair and the privatization of Zurich Airport in the years around 2001. I will return to the decline of political awareness later in this section. As Senior Project leader Public Affairs states:

> *"[The political attention is] not high … It used to be high. When the Swissair grounded, this was a really difficult time because in the same year Zürich Airport got privatized." (Senior Project Leader Public Affairs, Zurich Airport, 2016: 0:21:44)*

The previously higher political attention towards aviation can be illustrated by the federal government loan to Swissair to prevent Swissair from bankruptcy. But it can also be illustrated by the establishment of the "*Swiss Luftfahrtstiftung*" – a commission founded in 2005 in relation to Lufthansa Group's takeover of Swiss, with the purpose to secure the national interests of Switzerland in connectivity to and the operational independence of Swiss. The "*Swiss Luftfahrtstiftung*" had the authority to present issues of national and strategic relevance for Switzerland to the Swiss Management and Lufthansa Executive Board. The commission was only meant to function for 10 years and was closed in 2015 (Swiss Luftfahrtstiftung, 2015b). The commission concludes in its final report that after Lufthansa's acquisition of Swiss, Switzerland remains to have optimal connectivity to the most important destinations and Swiss has maintained its operational freedom[136] (Swiss Luftfahrtstiftung, 2015a, p. 8)

Präsident GATA SEV Aviation, National Council (MP) states in this relation that the commission is closed and there was no follow-up.

> "The first ten years, there was certain commission … to have contact [with Swiss], to take serious the interest of the nation, but that was finished 2014 and there were no follow up." *(National Council (MP), Präsident GATA: SEV-Aviation, 2016: 0:11:58)*

The function of this commission is further elaborated by Senior Project Leader Public Affairs, who states:

> *"The government built a commission called Aviation Commission or something, Swiss Aviation Commission. It was headed by the former member of the government and together with the two guys from Lufthansa, two Swiss politicians, and business people, and they decided that the president of the board of directors needed to be Swiss first, and they had the task to monitor the development of Swiss in Lufthansa Group. This was the control system they implemented in order to make sure that the interests of Switzerland as a country were respected by Lufthansa. And I think Lufthansa agreed to do that. And, of course, Lufthansa was the owner, so if Swiss wouldn't be profitable, they would have left it again. There wasn't a guarantee, but there was that commission." (Senior Project Leader Public Affairs, Zurich Airport, 2016: 0:32:05)*

[136] Own translation of: "*Der schweizerische Luftverkehr ist optimal an die wichtigsten weltweiten Destinationen angebunden und die Swiss hat weiterhin einen bedeutenden unternehmerischen Handlungsspielraum*" (Swiss Luftfahrtstiftung, 2015a, p. 8]

In relation to previously the political attention towards aviation is lower, this is recognized by the managing director, Center for Aviation Competence, as he states that aviation is not even on the top 10 within the political agenda. Even though Switzerland is a country with much export:

> *"Not really [high on the political agenda]. If you look at Swiss policies from the government still the financial industry seems to be very important and high on the agenda, tourism is very important on the agenda, the chemical pharma industry seems to be very important on the agenda. Aviation is not found on the top 10 list and for me aviation, if you have 80% export and import is the number one industry – or maybe number two or three, but differently not below number three and our government do not recognize it." (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:40:33)*

An interesting perspective stated by the Managing Director, Center for Aviation Competence is that "*politician do not understand aviation*" As he elaborates:

> *"Well, politician do not understand aviation – it is actual hard to explain [why there are low political attention], if you understand your export situation and where your country wealth comes from than aviation should be high on the agenda. For example in Dubai avation is number 2 or even number 1 on the political agenda. They say aviation makes 30% of their GDP. In Switzerland aviation only make 2% or what ever it is, so this depends on how you calculate GDP – for me: without aviation you would not have about 70% of companies in this country probably you would not have your import and export, so how do you calculate your GDP – it is not just the income of the airline and the passengers going in and out. The whole chain of companies there are here because they have access to the world – that is the link one has to make. And then suddenly you will figure out that aviation is highly relevant. Not as an individual money generator, but rather as an enabler for a whole range of companies generating money and jobs for the country, but that is something the government does not seem to understand." (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:44:57)*

The political attention towards aviation can be illustrated by the statement from the Senior Project Leader of Public Affairs of Zurich Airport, who stress that the lack of political attention could be because you cannot see the problem – the planes are still flying:

> *"This was the political decision that aviation is important and they came to the conclusion that it is essential for Switzerland to finance their own airline which operate as a hub airline in Zurich and the connectivity we used to have and we still have thanks to the hubsystem of Swiss. They sold it and that was the last time when aviation was really discussed in the wide public – from then on it started to work again they got profitable again – Zurich Airport got profitable again – very profitable now. The problem you can not really see them [problems] now – because it is still working: the planes are still flying. (Senior Project Leader Public Affairs, Zurich Airport, 2016: 24:47)*

This illustrates that aviation is not just a simple machinery that *'just happen'* (see: 3 Aeromobilities) Production of aeromobilities requires political will to support the production at the cost of externalities. Aeromobilities is depending on local, regional and global policies, and this can be a challenge in a political context. The current challenge with addressing the capacity challenges at Zurich Airport can be difficult to solve due to the complexity of various policies. As Projektleiter Infrastruktur, economiesuisse states:

> *"[T]he federal government has the competence but does not use it due to this setting of stakeholders. The main problems that the studies say we have here are development of capacities at high costs. I wanted to say that we have this spatical policies, we have environmental policies, we have foreign policies and we have transportation policies. And the goals… It is very difficult to bring all of those together in a consistent way" (Projektleiter Infrastruktur, economiesuisse 2016: 1:12:16)*

In this section, I have highlighted statements indicating that the public and political attention toward aviation is lower than it used to be historically. Further, there is a striking comment regarding the low political attention caused by lack of knowledge and the understanding for the wider benefits for the society caused by aviation.
In addition, the current challenge of addressing the capacity at Zurich Airport is currently not solved, and the solution can be a difficult and long process, due to the low political attention and the local inhabitants' environmental agenda. I will in the next Chapter: 10.6 The Materialities Dimension address some of the materialities that together with the policies enable and limit the production of Aeromobilities.

10.6 THE MATERIALITIES DIMENSION

In this chapter, I will highlight some of the key topics influencing the production of aeromobilities. The previous chapter highlighted that the policies influencing the production of aeromobilities in Switzerland, and I found that the production is depending on local and national policies and I found that there currently was low political and public attention towards aviation. This chapter will focus on the relation to Germany and the further articulated challenge of expanding capacity in Zurich Airport due to direct democracy.

As presented in previous section, Zurich Airport was built after WWII and initially, there was a lot of positive attention and support to construct Zurich Airport due the fact that aviation was perceived as a driver for growth and progress. As the Senior Project Leader of Public Affairs of Zurich Airport states:

> *"…when Zürich Airport was built in 1948 … it used to be a huge topic. It was real important for the region. The population stood behind it. It was a big event and everyone liked the new technology and everyone knew that it was going to be a game changer, it's going to be very important for us." (Senior Project Leader Public Affairs, Zurich Airport, 2016: 16:36)*

This statement can be seen in the light of the public's fascination for new technology and airports. As Roseau states: "*[After Second World War], it was not just the planes but the airport as a whole that was getting media attention and being turned into a suburban attraction"* (Roseau, 2012, p. 44). This was a common development that was seen in Paris and New York; that aviation no longer was associated with war and death, but a fascination development (Roseau, 2012)[42-43).

Switzerland is in the middle of Europe and is therefore well positioned - especially to in relation to Germany - to produce aeromobilities. In the figure below is illustrated the location of Zurich air with a catchment measured in drive time in car ranging in Switzerland and into France, Austria, but mostly into Germany.

Figure 32: Zurich Airport and its location especially close to Germany. The location close to Germany is (Zurich Airport, 2009b).

10.6.1 TREATY WITH GERMANY

Zurich Airport is located only 11 km from the city of Zurich. This position in relation to southern Germany and close to Zurich is a clear advantage since Zurich Airport can attract and serve a larger population in contrast to a solely domestic market. However, it is also a challenge due to externalities. Zurich Airport has three runways with a lay out that direct significant traffic flows over the southern part of Germany, villages north and south of the airport including Zurich and the Gold Coast of Zurich - where a wealthier part of the inhabitants of Zurich lives. These external relations between traffic and local residents are restricting the capacity at Zurich Airport. As the Head of Economic Affairs, FOCA states:

> *"If they can change the route, and that's Germany's problem, too, politically. If we can manage something with Germany to allow them to fly, and if we can manage to change the route when they fly directions south, [towards city of Zurich], then they can get some more capacity. But it will not be long, for 20 years. The capacity problem will be partly solved by the Dübendorf in the next 10 years, and then we will have no lands to build a new airport, so it's a small country" (Head of Economic Affairs, FOCA 2016: 0:48:21)*

In this quote, he also addresses the fact that solving the problem with residents in Germany and in Zurich does not solve the capacity problem in the long term.

The challenge with externalities in Germany have been constant since the mid-70s. There have been negotiations back and forth between Germany and Switzerland and in 2003; Germany reduced the number of allowed approach routes from 150.000 to 100.000. This dramatically reduction in allowed overflights led increased the

externalities over Zurich (Linden et al., 2017, p. 2). Switzerland did appeal to the EU commission regarding the German decision, but the appeal was rejected, and in 2012 a new treaty was signed: "*Germany has secured more quiet time while Switzerland has achieved long-term legal security and avoided a complete cap on approaches from the north*." (Zurich Airport, 2016). The implementation of the treaty complicates the takeoff and approach and if no extensions of runways are constructed will the treaty will limit the capacity at Zurich Airport[137]. The treaty states that between 6 AM and 7:00 AM during weekdays and between 6 AM and 9 AM during weekends, it is not allowed to approach Zurich Airport from Germany in the North is order to reduce the noise externalities for the German inhabitants during the mornings. The treaty will first be fully implemented from 2020 (Flughafen Zürich AG, 2012a; Zurich Airport, 2012). As stated previously, the needed modification of runways in Zurich will depend on a referendum in Canton of Zurich, which I will address in the next section.

The timeline of the noise dispute between Germany and Switzerland:

- 1984: Agreement between Switzerland and Germany on the use of German airspace for landings and take-offs at Kloten.
- 2000: Germany announces the abrogation of the agreement for May
- Oct 2001: A new agreement signed.
- Mar 2003: Swiss parliament refuses to ratify the agreement, whereupon Germany halts the ratification process.
- 2003: Germany issues a unilateral decree about flights over southern Germany.
- Jun 2003: Switzerland appeals to the EU Commission about the German decision.
- Dec 2003: The Commission rejects the Swiss appeal.
- Feb 2004: Switzerland appeals to the European Court of Justice against the Commission ruling.
- May 2005: Court of Justice refers the appeal to the General Court - the lower appeals court.
- Sep 2010: General Court rejects Swiss appeal.
- 2012: New treaty was signed
  (swissinfo.ch, 2010; Zurich Airport, 2016)

This noise dispute with Germany is a challenge for Zurich Airport and illustrates the externalities from producing aeromobilities. It generates a problem that is not linked

[137] The treaty defines different concepts of flight paths in relation to take off and landing at Zurich Airport, such as South concept during the morning, North concept during the day, and the East concept in the evening. Due to runway configurations the different concepts has provides different capacity limits for Zurich airport ranging from 66 ATM per hour to 50 ATM per hour (Flughafen Zürich AG, 2012a; Flughafen Zürich AG, 2012b). See definition for ATM is chapter 10.6.2 Capacity – a Consequence of Direct Democracy10.6.2.

to a given political orientation, but the position towards these externalities are more a question of where the inhabitants live in relation to the Zurich Airport. As Projektleiter Infrastruktur, economiesuisse states:

> *"We have Germany here and they put some limitations on flights. … "Okay, we have too much noise here. There is a maximum of flights." … . So, this brought the whole noise problem down to the inland, let's say. So, this whole issue became much more important in the inland because the Germans just said, "Okay, you have to organize this in a different way." The struggle is not on a left/right wing politically, it is more like "Am I living in the north? In the south? In the east? In the west?" Who has more noise, who has less noise?" (Projektleiter Infrastruktur, economiesuisse 2016: 0:37:02)*

This conflict with Germany illustrates that aviation is not just a simple production machinery; it is highly influenced by local and regional aspects. Below is an illustration of the North and the South concepts of flightpaths approaching and taking off Zurich Airport. This is just an example of the how different areas around Zurich Airport is affected by the noise externalities.

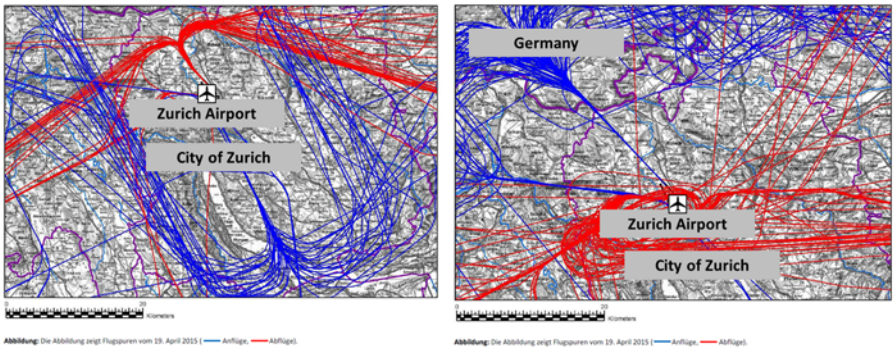

Figure 33: An illustration of the flight path for aircraft approaching (blue) and taking off (red) for the South concept (left) and the North concept (right). This illustrates how the City of Zurich is noise exposed by the South concept and Southern part of Germany is noise exposed by the North concept. (Flughafen Zürich AG, 2015a; Flughafen Zürich AG, 2015b)

10.6.2 CAPACITY – A CONSEQUENCE OF DIRECT DEMOCRACY

Besides the issues with the flightpaths, Zurich Airport has – as previously addressed – a limited capacity compared to other airports solely due to the layout of the runways. Currently, there is a capacity of 66 movements per hour (see Table 15), which is lower than most European airports. Senior Project Leader Public Affairs at Zurich Airport articulates the challenging capacity situation:

> *"1990 we had about 15 million passengers, something like that, and today we have 26. Now we are reaching the limit. So the technical limit would be like 35. But of course, in peak times we are already at the limit now." (Senior Project Leader Public Affairs, Zurich Airport, 2016: 21:18)*

And as stated previously by the Managing Director, Center for Aviation Competence, he stresses that the runway layout course has some serious capacity issues:

> **"***That is true [there is a capacity issue in Zurich Airport], that is also homemade – I mean your build 3 runways that cross each other you have a homemade problem. You have 3 runways, but a capacity of about 1.3 runways – I mean it is just bad architecture!"(Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:45:13)*

Below illustrates the runway system at Zurich Airport, that due to the two crossing runways has limited capacity.

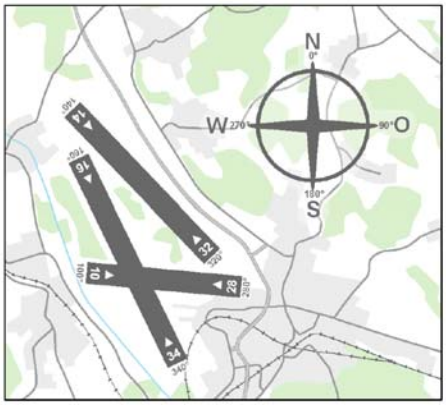

Figure 34: Runways system at Zurich Airport, with three runways, where two are intercepting which limits the capacity (Flughafen Zürich AG, 2012a)

Capacities in airports can be measured differently due to the complexities of different flows associated with passengers and aircraft. One of the ways to measure capacities of an airport is based on how many operations their runways system can facilitate. The capacity of such a runway system is dependent on several dimensions and can be enhanced due to the expansion of the runway infrastructure itself but also due to technological progress, that allows aircraft to operate close together without jeopardizing safety. Below is a table that presents the runway capacities around Europe. Here it is illustrated that Zurich Airport currently only has a runway system with a capacity of 66 ATM[138], which is the second-lowest capacity among these selected airports[139]. Based on this table, Istanbul airport has the lowest capacity, however, this will change when the new Istanbul airport is inaugurated later in 2018 and operating at full scale from 2028[140]. At this time, the Zurich Airport will have the lowest capacity among these selected airports.

		Airport passengers	Airport capacity measured in ATM
Airport	Code	Mio. pax (2013)	Current
Paris	CDG	62	104
Madrid	MAD	40	100
Frankfurt	FRA	58	98
Amsterdam	AMS	53	93
München	MUC	39	90
Rom	FCO	36	90
London Heathrow	LHR	72	87
Copenhagen	CPH	24	83
Brussel	BRU	19	74
Malpensa	MXP	18	70
Wien	VIE	22	68
Zurich	ZRH	25	66
Istanbul	IST	51	58

Table 15: Airport capacity at major European hubs and airports in the western part of Europe. The table illustrates that compared to other European airports, Zurich Airport has one of the lowest capacities measured on ATM within the runway system. Source: (Senior Project Leader Public Affairs, personal communication May 17, 2016 (Intraplan Consult GmbH, 2015, p. 80).

To fulfill the treaty and to increase runway capacity in the future, modifications or relocation of runways is needed. The airport is in mountainous terrain, which limits the takeoff and approach possibilities, but it also challenges the future layout

[138] ATM is an abbreviation for Air Traffic Movements, that measures have many operations (take off or landings) the runway system can facilitates per hour.

[139] Data for this table is based on material from Zurich airport (Senior Project Leader Public Affairs, personal communication May 17, 2016). The received material is based on report: Monitoring der Wettbewerbsfähigkeit des Schweizer Luftverkehrs 2015 produced by consultancy company: Intraplan Consult GmbH (Intraplan Consult GmbH, 2015, p. 80]

[140] See: https://centreforaviation.com/data/profiles/newairports/istanbul-new-airport-istanbul-grand-airport

possibilities. One of the biggest challenges in increasing capacity by new runway capacity is how the local inhabitants in Zurich and the surrounding will address this. Since the airport is owned and located in the Canton of Zurich[141], an expansion will at some stage requires a referendum in the Canton for Zurich (Senior Project Leader Public Affairs, Zurich Airport 2016: 1:00:28) This is a key challenge. Switzerland is a federal country with long traditions for regional referendums on different kinds of matters. As Projektleiter Infrastruktur, economiesuisse and Senior Project Leader Public Affairs states:

> *"[Switzerland is] a federal organized country. So, everything comes bottom up. Subsidiary principal is very important in our whole politics… That means basically that we understand our country as built from the bottom up." (Projektleiter Infrastruktur, economiesuisse 2016: 0:09:29*)

> *"Consequently and because of the Swiss model of direct democracy all major developments of airport infrastructure were [and still is] subject to a referendum" (Senior Project Leader Public Affairs, Zurich Airport, personal communication May 9, 2016; Jun 16, 2018).*

Switzerland is a country that is much decentralized and a lot of competencies are placed within the cantons. This can cause problems in relation to issues that produces local externalities, and where the benefits are distributed at a national level. This is the case with aviation, where the benefits are at the expense e.g. of noise, emission, and land use (see: Chapter 3 Aeromobilities) The local competencies within the Canton combined with the externalities is a challenge when national interests and policies are imposing future increase externalities, as Projektleiter Infrastruktur, economiesuisse states:

> *"But, this is really with the context of direct democracy in Switzerland, the bottom up approach; this might be even more difficult to find a consensus somehow between local interests and national policy than in other countries where the political system works a little bit differently. This is my impression." (Projektleiter Infrastruktur, economiesuisse 2016: 0:45:08)*

In the Federal Constitution of the Swiss Confederation article 87 states: "*The legislation on rail transport, cableways, shipping, aviation and space travel is the responsibility of the Confederation*" (The Federal Council, 2017).

[141] As stated previously the Canton of Zurich owns 33% + 1% share of the Zurich, this give the Canton of Zurich a veto, since it requires 66% of the votes to pass significant changes at Zurich airport. (Senior Project Leader Public Affairs, Zurich Airport 2016: 51:26)

As Projektleiter Infrastruktur, economiesuisse states:

> *"We also have an article in the federal constitution, Article 87, I think, that basically says legislation of aviation is a competence of the federal state." (Projektleiter Infrastruktur, economiesuisse 2016: 0:15:16)*

However, the challenge is that the federal state does not use this article to impose an infrastructure expansion at Zurich Airport. Projektleiter Infrastruktur, economiesuisse, addresses this by stating that due to the local stakeholders they cannot use this article:

> "*They are not really using this article to really promote their policies, because they have to… there are so many stakeholders that are in place here and they cannot just rule the way they want. They really have to take into consideration the opinions of local interests, the opinion of the cantonal governments, and so on." (Projektleiter Infrastruktur, economiesuisse 2016: 0:15:59)*

One could think, that in order to solve the conflict between the local and the national interest, why not just redistribute power to the federal level, but this has been discussed and in the end, nothing has changed as Projektleiter Infrastruktur, economiesuisse states:

> *"In the recent discussions with the new strategy, there was this discussion "Okay, should we take some competencies away from the canton and put it to the federal government?" … This is highly political. You can barely discuss it, because it is such a taboo topic because no one wants to give away competencies. The canton is under high pressure from the local governments because of the whole noise problematics" (Projektleiter Infrastruktur, economiesuisse 2016: 0:22:04)*

This challenge with the direct democracy and the local externalities also illustrates that even though you have might have a strong policy for promoting aviation, elements such as national vs. regional interest combined with materiality of organizing the country, which implies direct democracy can make it difficult to implement.

10.6.3 ALTERNATIVE SOLUTIONS TO THE CAPACITY CHALLENGE

As addressed in the previous section, there are significant challenges with capacity at Zurich, this combined with the direct democracy, a lower political attention and a belief in market forces with as little as possible intervention from the state generates a situation where a solution is not straightforward.

The challenge with noise externalities will not be less in the future due to an increase in population around Zurich Airport, as stated in Airport Report 2016 from the Canton of Zurich:

> *"The population grows especially where the cantonal spatial planning concept are present, namely in the areas with the best public access to the south and west of the airport. In these partially densely populated areas, the number of people affected by aircraft noise is rising due to a desired development, even if the aircraft noise level remains the same. This increase could be halted at the most, if the arrivals and departures could be led more over less densely populated area*[142]*." (Kanton Zurich Regierungsrat, 2016, p. 3)*

In relation to these concerns regarding noise and growing population around Zurich Airport, Zurich Airport are obliged by the law to finance noise production in buildings, as stated in the annual report 2016:

> "…*sound insulation programme is a key element in the airport's efforts to minimize aviation noise exposure. The programme includes and finances passive noise protection measures in buildings in neighbouring municipalities. As the airport's operator, Flughafen Zürich AG is obliged by law to fund these protective measures*." (Zurich Airport, 2013, p. 32).

The noise insulation initiative concerns two programs: Programm 2010 and Southside protection concept (Zurich Airport, 2018b). Programm 2010 concerns the inhabitants exposed to a certain level of noise in the near surroundings of the airport. Currently, the programs have facilitated window-insulating in housing up to 10 km from the Zurich Airport[143] (Flughafen Zürich AG, 2018). The south side protection concepts are focusing on insulating bedrooms window in order to lower the noise externalities from the incoming morning flights in a corridor south of Zurich Airport toward Dubendorf. The current estimate is that up to 10.000 bedrooms will have sound-isolation related to windows and fans (Flughafen Zürich AG, 2016).

[142] Own translation of: "*Dass die Bevölkerung vor allem dort wächst, wo das kantonale Raumordnungskonzept es vorsieht, nämlich in den mit öffentlichem Verkehr bestens erschlossenen Gebieten südlich und westlich des Flughafens. In diesen teilweise dicht besiedelten Gebieten steigt die Zahl der vom Fluglärm Betroffenen aufgrund einer erwünschten Entwicklung selbst bei gleichbleibender Fluglärmbelastung an. Dieser Anstieg liesse sich höchstens aufhalten, wenn die An- und Abflüge vermehrt über weniger dicht besiedeltes Gebiet geführt werden könnten*." (Kanton Zurich Regierungsrat, 2016, p.3]

[143] Range is estimated based on google map.

These programs illustrate there are approaches in order to address some concerns of the local inhabitants around Zurich Airport.

A potential solution to the capacity problems at Zurich Airport could be that instead of the construction or modification of new runways trains connected to other parts of Europe can relief the capacity constraints at Zurich Airport, as Head of Economic Affairs states:

> "*Short destination, I think the train can be part of the solution*" *(Head of Economic Affairs, FOCA 2016: 0:49:31)*

This potential solution is acknowledged by the Managing Director, Center for Aviation Competence, but there are some challenges with this solution since trains make more noise and the rail infrastructure are not built yet:

> *"I agree, but it is not easy because you would have to have high speed rail connections directly from Zurich Airport to the big cities in Europe. We do not have it. And if you have to drive 3,4,5 hours it wouldn't work – if you can reach a place within 2 hours no problem – then it could be a good solution. But before we can do this we need to build train tracks, to build train tracks it is even more difficult than to build airports because trains makes even more noise than planes, they are even closer to people, they actual destroy much more landscape than an airport does – it is kind of even worse. So nice idea, but we have not had it build yet. It is quite difficult. In France it works. They have TGV – it connects the airports rather well. …. But in Switzerland I do not see it at the moment – it would require a lot of investment in to ground transport." (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:48:49)*

Another solution to the capacity problems in Zurich Airport could be Dübendorf airport next to Zurich. This airport could be used for general aviation. Development of other airports is in line with the suggested capacity solution in The Netherlands, where Lelystadt is under development. An interesting perspective in this sense is that Dübendorf airport actual replace by Zurich Airport in 1953.

> *"[Dübendorf] is a military airport at the moment and the plan is to open it to the business jets and general aviation, so it would free capacity at the main airport in Zürich. It's still a cantonal decision, but the confederations of political unit FOCA is very active to open that." (Head of Economic Affairs, FOCA 2016: 0:17:51)*

Unfortunately, Dübendorf airport is not a long-lasting solution. Within 20 years, capacity at this airport will be fully utilized, and then, there are no obvious solutions

to the capacity to produce aeromobilities in the Zurich region, for as the head of economic affairs states:

> *"But it will not be long, for 20 years. The capacity problem will be partly solved by the Dübendorf in the next 10 years, and then we will have no lands to build a new airport" (Head of Economic Affairs, FOCA 2016: 0:48:20)*

These capacity challenges and debates have fostered a new considerations such as whether the continued growth at all is good or whether people actually need to travel more. As Managing Director, Center for Aviation Competence, University of St. Gallen

> *"But the question is do you need to grow. … The question is do you have to grow? Is there a need for more travel? I mean, we have a certain amount of people in Switzerland that has to fly, the question is how much do we really need as a capacity? You know, I'm not supporting the general growth model; when I look at data I see a flatting growth rate in Europe – I think we might have reached peak travel, or we might reach peak travel activity at a certain time. I don't think we need more and more air transport, the growth is not going on forever." (Managing Director, Center for Aviation Competence, University of St. Gallen 2016: 0:55:35)*

This materialities dimension unfolds how the production of aeromobilities and making of a hub airport in Zurich takes place. In the context of Zurich Airport this section illustrates the drivers behind the development of aeromobilities have to take into account the spatial relation to Germany and is under influence by the inhabitants of Zurich due to the federal system and the ownership of Zurich Airport by the Canton of Zurich as well. Further, this section illustrates that the alternative to solving the capacity problems in Zurich Airport could be by allocating more European traffic to trains or allocate more traffic to the Dubendorf Airport, but these solutions are either expensive financially or actually produce similar problems in respect to noise and land use as the solution with Zurich Airport is facing. Additional the reallocation of traffic to Dubendorf Airport might not be long lasting, resulting in a future challenging situation similar to the present situation. Due to this challenging situation for the production of aeromobilities, some stakeholders are questioning whether future air travel growth is needed.

10.6.4 SWISS

In this section, I will address the airline Swiss and Swissair and their role in generating connectivities at Zurich Airport and for the Swiss society. As previously mentioned in the section 10.4 Zurich Connectivity, Swiss provides 53% of all departing seats in

2017, and 89% of the transfer passengers. Historically, Swiss and previously Swissair had significant influence on the development of Zurich Airport.

Since Swissair and Zurich Airport was not diminished during WWII, the airline was ready to develop it business after the war. In 1946, the Minister of Transport in Switzerland articulated that Switzerland should only have one airline, the state should own a minority stake in the company and its should have domestic operations, within Europe and overseas in the interest of the public (Meyer, 2017, p. 91).

Even though Swissair was privately founded in 1931, the Federal Aviation Office did in 1950 get a veto on Swissair's strategical decisions in return for the government had bought two new aircrafts (Meyer, 2017, p. 92). During the 1950s and 1960s Swissair was successful and generate generated significant profit, at this time Swissair became known as a *flying bank* (Meyer, 2017, p. 93). The airline became successful for several reasons, one of the reasons was due to the many international headquarters located in Switzerland such as UN-agencies e.g. WHO, UNHCR, Red Cross headquarter including FIFA and several financial institutions and the associated banking secrecy (Meyer, 2017, p. 94). Swissair continued its positive development throughout the 1980s and 1990s by continuing the expansion not only its route network but also into associated aviation business areas e.g. catering and hotels. In addition, several constellations with other airlines – such as SAS and KLM – was initiated to develop the Swissair (Meyer, 2017, p. 95). In 1978, Crossair was founded as a regional airline by a former Swissair pilot, and during its development, the airline became a partner to Swissair on smaller regional routes, how Crossair was finally taken over by Swissair in 1991 (Meyer, 2017, pp. 95, 98).

Due to the liberalization in the 1990s, the airline industry faced increased competition, which also influenced Swissair to lower ticket prices in order to be come more competitive (Meyer, 2017, p. 98). As part of this new competitive situation, Swissair tried together with KLM, SAS and Austrian to setup an alliance, but this failed in 1993 (Meyer, 2017, p. 99). Later in 1995, Swissair bought 49% of Sabena in order to develop the hub in Brussels Airport, and later in 1998, Swissair initiated the *Hunter strategy* – as mentioned in section: 10.5.2 – with an objective to acquire minority stakes in several other airlines in order to become the third largest airline network in Europe with high-quality standards. Swissair managed to purchase stakes in 10 airlines, but the constellation never succeeded in becoming profitable and in the challenging aviation market after 11 September attack in New York, 2001, Swissair was grounded early October 2001, due to financial problems (Meyer, 2017; Suen, 2002). As stated in section: 10.5.2.2, the Swiss Government did provide financial support to bridge the crises between the grounding of Swissair and the assets transfer to Crossair ,which was renamed as Swiss International Air lines in 2002. Later in 2007, Swiss was acquired by Lufthansa and as concluded in *Swiss Luftfahrtstiftung* (see: 10.5.4) this has not led to an unfavorable development in connectivities. In relation to the development of transfer traffic, the numerical level in transfer

passengers has not changed dramatically – it has been relatively constant at 8 million passengers since 2008 as illustrated in section: 10.4 Zurich Connectivity.

The Ministry of Transport in Switzerland did after WWII articulate that Swissair should operate in the interest of the public, and Federal Aviation Office had a say in the strategical direction for the company. However, as stated in section 10.5.2.1, because of the liberalization, the aviation industry has to operate on markets terms and state interference should be reduced to a minimum. Consequently, there are no direct political involvement in how Swiss should developed its hub activity at Zurich Airport. Head of Labor Relations & HR Steering at Swiss states, that Swiss has to match market demands; therefore the focus of development Zurich Airport as hub is not a goal in its self, but a natural consequence of optimization of route network:

> *"The aim is not to act solely as a hub [in Zurich Airport], but actually to see the demand in Switzerland to match destinations, and then to offer the network that is tied to the economic and societal demands in Switzerland. … The twist is that in order to enable these connections, we have to offer hub and spokes because otherwise we will not be economically feasible" (Head of Labor Relations & HR Steering 24:23)*

This short brief on Swissair illustrates the very successful period after WWII to the 1990's where the airline was grounded and that the new airline Swiss was constructed. Even though there historically has been political involvement in the aviation industry, the current involvement is low and it is left to the market forces.

10.7 EPILOGUE

This chapter unfolds the drivers behind the development of aeromobilities in Switzerland and Zurich, and how the grounding of Swissair and the capacity challenge in the Zurich Airport is approached within a nexus of Policies and Materialities. In addition to this analysis, I have identified a discourse, which encapsulates the foundation of these approaches, I label the discourse: *Aeromobilities on the basis of direct democracy and the market*. After I have argued for the discourse that is linked to a rationality based on the federal system, I will highlight elements from this case that can be used to develop the a hub airport governance model..

Throughout my analysis, I have found different objectives of Policies and Materialities that relate and depend on each other to generate this situation for the development of aeromobilities in Switzerland; the production is dependent on space and time. One of the major events in Swiss aviation was the grounding of Swissair in 2002, which has influenced the production of aeromobilities in many aspects. In relation to my meta-theoretical position, this development illustrates that aviation

systems cannot be consider as a straight-line process, since events can disrupt this historical trends (see: section 4.3.1 Dynamic Causalities and Verstehen). This event did not only generate a decrease in connectivities in Switzerland and in the Zurich Airport, it also meant a revision of the entire safety perspective on Swiss aviation. The grounding of Swiss also led to a new *Civil Aviation Policy Report* by the FOCA in 2004. It is stressed in this policy that aviation is of vital importance to the Swiss society in terms of connectivity business centers around the world, but also in relation to the economy in terms of the level of domestic jobs. The report recognizes that Swiss still has – even after the grounding – a special role in the production of aeromobilities in Switzerland. The grounding of Swiss did create a political awareness towards aviation; this is illustrated by the loan by the federal government, but also later in 2005, where the government settled the committee to monitor the connectivity development in Switzerland after Lufthansa's acquisition of Swiss. Disregarding this practice, the *Civil Aviation policy* from 2004 still emphasizes that aviation needs to be left to the market. This development illustrates that the dynamic causalities between Policies and Materialities generate a certain outcome. However, over the years the political attention towards aviation is argued to have been lowered, even though there are new challenges to the development of aeromobilities.

An important dynamic causality in this case of Zurich Airport is regarding local and cross-national relations. After years of dispute, Germany and Switzerland did settle a treaty in 2012 addressing the departure and arrival flight paths related to Zurich Airport, which to some extent is crossing German territory, generating noise externalities in Germany. The final treaty gives room for moderate growth of Zurich Airport, but sets restrictions in the morning for aircrafts operating over German airspace approaching and departing from Zurich Airport. Consequently, there will be an increase in morning flight operation over Zurich and villages around Zurich Airport. Due to the change of flight paths and use of runways, the runways system needs an extension of runways 28 and 32, in order for all aircraft types to operate during different weather conditions. Alternatively, Zurich Airport would have to decrease its already scarce capacity. In August 2017, FOCA presented a new updated *Sectoral Aviation Infrastructure Plan* (SAIP 2) with an extension of runways 28 and 32 and issues related to different safety operations aspects. Regardless of this updated SAIP 2, the modifications of the runway system still needs an approval by the board of directors at Zurich Airport. Due to the ownership structure, where the Canton of Zurich owns 33% + 1 share in Zurich Airport, the board members representing the Canton of Zurich are able to veto changes in infrastructure such as runways. The Canton of Zurich has stated that in the case of such infrastructural changes, that could increase the noise externalities for the citizens for Zurich, the Canton of Zurich will sooner or later make the citizens vote for such runway modification by a referendum in Zurich. This situation illustrates that the development of aeromobilities in Zurich Airport depends on time and space; both in relation to national and international interests, as well as central government and local interests. Due to the ownership structure and the federal system, the development of Zurich Airport is very dependent

on the willingness by the local citizens to accept such a development of capacity, even though a modification of runways will be a national interest. Beside the current issues related to the short-term capacity issues at Zurich Airport, the long-term capacity crunches still need to be addressed and settled which is estimated to be a process that could take up to 15-20 years.

In addition, to the challenge with the potential willingness of the inhabitants around Zurich Airport to accept such a modification of runways, one of the other challenges as articulated in my analysis, is politicians' lack of understanding of the complexity of aviation. This could point towards a reason why politicians on a national level don't pay much attention to aviation and therefor don't have the courage to address the future capacity issues at Zurich Airport. This could also be linked to the statement in FOCA 2016, highlighting that aviation has to be handled based on market conditions. Regardless of this situation, Zurich Airport by law has been required to finance and promote a sound isolating program targeting inhabitants exposed to noise externalities.

Due to the problematic situation in Zurich Airport some stakeholders raises the question of whether more aviation traffic is really needed, and there is a discussion of potential alternatives such as reallocation of some traffic to Dübendorf Airport or to improve the high-speed train network to Europe in order to relieve Zurich Airport from some of its European traffic flows. Even though these perspectives are debated, the alternatives are also problematic since Dübendorf Airport has limited capacities and high-speed trains produce externalities of noise and require land use.

These Policies and Materialities constitute the dynamic causalities that produce the aeromobilities in Zurich and Switzerland. This case illustrates that the development of capacity and aeromobilities in Zurich Airport is very dependent on political attention and courage to find capacity solutions. Currently, the political attention is not high; this could be due to the fact, that future capacity issues are not visible since planes are still flying and in addition, the current noise externalities decrease the willingness to address the future capacity issues.

Based on this analysis, and as mentioned initially in this section, I have identified a discourse that I label: *Hub aeromobilities on the basis of direct democracy and the market*, which I will argue sets the direction of the development of aeromobilities in Switzerland and Zurich Airport. The discourse is linked to articulations of interviewed persons and policies. In the latest two *Civil Aviation Policy Reports* from 2004 and 2016 there is a focus on aviation that needs to handled by the market since an alternative protectiveness would have negative consequence for Switzerland. Furthermore, there is an acknowledgment of Zurich Airport and its function as the hub, where Swiss plays an important role. Nevertheless, there are also articulations from stakeholders that stress that Swiss is of less importance as long as the connectivities are maintained. An interesting perspective in the Civil Aviation Policy

Reports is the focus on connectivities to major business centers around the world, which articulates a purpose of aviation development in Zurich Airport. However, this market orientation needs to coexist with direct democracy, which could challenges the progress towards capacity solutions in Zurich Airport, as stated: *"Consequently and because of the Swiss model of direct democracy all major developments of airport infrastructure were [and still is] subject to a referendum" (Senior Project Leader Public Affairs, Zurich Airport, personal communication May 9, 2016, Jun 16, 2018).* In addition to these articulations, various practices generate the foundation for my identified discourse. The practices associated with negotiation traffic rights by FOCA are based on a market approach where the importance focus is on connectivities and not a specific airline such as Swiss. Furthermore, there have historically been practices or intervention to the financial support of Swissair, however it was argued that this intervention was not to save Swissair, but to prevent potential loss of domestic jobs. Therefore, I will argue that despite the liberal mindset towards the development of aviation, the discourse is also linked to the rationality behind the federal system of Switzerland, as Projektleiter Infrastruktur, economiesuisse articulates: *"[Switzerland is] a federally organized country. So, everything comes bottom up. Subsidiary principal is very important in our whole politics… That means basically that we understand our country as built from the bottom up." (Projektleiter Infrastruktur, economiesuisse 2016: 0:09:29*).

This case of Zurich Airport, illustrates several elements that are relevant for developing the airport governance model based on section 6.2.4 Structure of Governance. First of all, development of aviation has to be based on an understanding of national and international relations, which in this case is illustrated by how the treaty with Germany related to flightpaths influence the development of Zurich Airport. Secondly, this case shows the conflict between national and local interests – a conflict that can be linked to the NIMBY conflict (see section: 3 Aeromobilities). This case illustrates that due to the direct democracy, the capacity solution is not a straight forwards process, the situation highlights that a governance model needs be aware of the local relations, because without such a focus the development of aviation can be damped. Thirdly, after Lufthansa acquisition of Swiss there was established the *Swiss Luftfahrtstiftung* committee to monitor the development of connectivity to most important destinations and the operational freedom of Swiss. The committee concluded that after 10 years that both objectives was fulfilled. It is important to stress that it is not given that the committee had influence on the either connectivities or the operational freedom of Swiss, however a political attention towards such developments can provides information and therefore the possibility to interact and interfere timely if developments deviates from the anticipated development.

After highlighting my findings related to the case of Zurich, I will in the next chapter conduct a cross-case analysis of the four case airports in order to identify themes, that are influencing the development of hub airport. In addition I will also several elements that are important for developing a governance model for hub airports.

11 CROSS-CASE ANALYSIS

In this chapter, I will sum up my findings from my four previous cases related to making of hub airports. Based on my analytical approached within the dimensions of Policies and Materialities, I will argue for different themes that are influencing the development of hub airports. These themes have a wider societal perspective compared to the conventional research agenda on hub airports and illustrates that the production of aeromobilities cannot be considered as a flow machine, but hub airports needs to be understood as part of society. The conventional aviation research is often based on a '*predict and provide'* approach and relies on different socio-economic quantitative models as argue for in section 2.3 Conventional Aviation Research.

Based on an aeromobilities research approach, I have argued that hub airports also needs to be understood and researched as a relational place where the production of hub airports actively can be developed. Below, I will argue for four themes that are influencing the production of such hub airports both in relation to an understanding of hub activities as an airline business model as well as a nexus of infrastructure and mobilities. I addition to these themes I will lastly, elaborate on different elements that based on my case studies seems to be relevant for a governance model for hub airports.

Policies approach to spatial planning. The physical and spatial development has to be addressed actively in order to support and develop hub airports. As founded in the case of Amsterdam, there has been and is still an approach to spatial planning based on the interest of society in relation to development of Schiphol Airport. This is exemplified by a political approach where elements of the spatial elements are kept within the governmental premises and responsibility to support the overall competitiveness of the country and by this to "*Create a good quality of life*". In the Helsinki case, I found that an active political involvement in the generating ground transport to and from the airport is essential to support the making of Helsinki airport as a hub. In contrast, as illustrated in the case of Brussels Airport, the decentralized focus on aviation due to the federal system in the country did have consequences for the airport, since e.g. train stations for high-speed trains was not initially located at the airport. As founded in the case of Zurich Airport the spatial layout for developments of the airports infrastructure is presented by the federal council, however due to the owner structure of the airport and the direct democracy in Switzerland, the development of the airport is much depended on the local inhabitants in the canton of Zurich. This can be a challenge due to the conflicts between noise externalities from the airport and the development of Zurich Airport for the benefit for entire Switzerland. This theme illustrates that the policy approach towards spatial planning needs to be balanced between the interests of the locals around the airport, but also in relation the interest of the national connectivity.

Policies approach to externalities. Externalities from aviation is a challenging and very important dimension to address in order produce hub airports and aeromobilities. In contrast to the wider societal positive effects such as job and contribution to GDP, the externalities both have a local, regional, national and global reach and a policy towards these are vital for aeromobilities to be produced. The case of Amsterdam and the Alders Table is a good example of how the growth in hub airport activities and noise externalities are addressed, but it also illustrates that production of hub airport is not without costs. Without an active political involvement in addressing these externalities, the development of aeromobilities can be reduced. This is also illustrated in the case of Zurich, where the noise externalities can have negative consequences of the development of the connectivities, even though these externalities are been addressed by sound isolation of exposed housing areas. Disregard of these sound-reducing initiatives in Zurich, there are considerations of how much more aviation is needed. In Brussels Airport noise externalities are a significant challenges, since the layout of runways distribute air traffic and noise externalities towards highly densest housing areas, however due to federal system there is not a unilateral approach to solving these challenges. In addition to noise externalities, there are other forms of externalities such as land use and pollution of various forms e.g. CO2 emission from aircrafts. Even though this latter dimension has not been a theme with a significant focus in my collected data, the increasingly political attention towards this externality can have influence on the future production of aeromobilities.

Policies approach towards hub airports. Hub airports can be understood differently; as a facilitator for network airlines or as an airport with a nexus of different forms of infrastructural mobilities such as rail and highways along air transport. Depending on the understanding of what a hub airport is, policies will differ. However, an active policy towards these dimensions can promote and develop the hub airport and the country's connectivity. In Amsterdam the policies towards Schiphol is very much articulated in terms of both focusing on KLM as the hub carrier at the airport, but also in the historical development of supporting landside infrastructure. In contrast, the lack of public aviation policies towards Brussels Airport, as argue for in the case of Brussels Airport, have not generated the same positive development as e.g. in Amsterdam Airport. In contrast to the unilateral focus on Schiphol Airport; due to the federal system in Belgium has generated a situation where it is difficult for government to prioritize the development of Brussels Airport without having to accept financial support to other regional airport, which can generate financial difficult situations. The understanding of the need for a network carrier to facilitate the extensive connectivities due to its feeder network is essential to develop hub airports. In the case of Amsterdam, the selective criteria illustrates such a focus on hub carriers as essential for the Dutch society, and in addition in the case of Helsinki, where there is an understand of Helsinki airport as a hub for Finnair to support the domestic airports and domestic coherence. As illustrated there are different approaches to hub airport policies, but the essential thing is that based on an active policy towards the different forms for hub airports, the aeromobilities can be strengthened.

Overall political attention to develop hub airports: Aeromobilities and production of hub airports are a difficult and complex aspects for societies to address, however as illustrated in the different cases, I have identified different discourses that generates the foundation for different Policies and Materialities which constitutes the dynamic causalities for the production of hub airports. The political attention and therefore the willingness to allocated time and resources to aviation is mostly associated with an understanding of the function of the hub airport. In the case of Helsinki, the political understanding of aviation as a facilitator for domestics and European coherence is an enabler for the political attention, and the Asian strategy from Finnair is a clear articulation of what needs to be achieved for domestic and European coherence to be maintained and developed. Such a purpose helps to set political direction in where and how the political environment can support the development of aeromobilities. I the Netherlands, the discourse related to the aviation as an engine for society, stimulates the political attention and support in solving the challenges for the hub airport. In addition, Schiphol's vision of: "*Connecting to compete and Connecting to complete"* is a very strong articulation of the function of the airport that reinforces the political understanding of the function for the hub airport. The strong political will to support the development of aviation in these two cases are founded in wider societal understanding for the industry. However both cases have a history where aviation to some degree has been used as a way to solve societal challenges in the past, as illustrated in the case of Amsterdam with the challenging times in the 1970s and 1980s, while in Finland the hub airport is a foundation to solve the coherence challenges. Therefore, I will argue for that the political positive attitude towards aviation is founded in an understanding of aviation as a way to solve or address different societal challenges. In relation to Helsinki and Amsterdam, it is important to stress that the political support and engagement in developing the hub airport require long-term commitment and willingness to address challenges such as externalities in order to achieve the articulated purpose of the production of the aeromobilities. In contrast to this, the lack of political willingness or possibilities as shown in the case of Brussels or Zurich can generate situations where the hub airports in some ways are limited in their capabilities to produce connections to the benefit for society. Overall, in relation to the political attention toward hub airports; based on my different case studies it seems that the production of successful hub airports needs to go hand in hand with high political attention founded in the understanding of hub airports as part of society.

Governance model for hub airports.

In order to develop a governance model for hub airports, I will highlight several elements based on my empirical finding that needs be addressed in order to develop the basic governance model of understanding (see: section 6.2 Governance) into a governance model for hub airports. As stated in section 6.2 the basic governance model of understanding is a framework where the market and the state can bridge and synthesize opinions in order to progress towards a common goal. I addition to this I will suggest that the governance model is based on an consensus-decision model,

where all stakeholders give and take in relation to each other and in the interest of society. The governance model for hub airports needs to be widely founded with several stakeholders representing different communities, industry and political environment, in order to synthesize different opinions and generate a common understanding for the progress and outcome. To set a direction for the development of aviation, there are different relevant elements to be address in line with the themes above. The governance model for hub airport needs to address externalities and spatial development and there is a need for unilateral political focus on the hub airport. It is important for the involved stakeholders to recognize that the foundation for a successful aviation hub airport is a strong network of feeder traffic to support different forms for long-haul connectivities. Lastly, the governance model needs to be based on an understanding of aviation is not a local isolated entity, but regional, national and global dimensions needs to be taken into consideration in order to reach a common goal.

12 CASE – COPENHAGEN

12.1 PROLOGUE

In this chapter, I will analyze the Copenhagen Airport in relation to the findings in the cross case analysis. The approach in the chapter will have another character in relation to the other four cases. At this stage in my research, I have gained more insights and therefore I will analyze the case of Copenhagen Airport throughout the chapter in relations to findings from the other international cases, even though the main structure of the chapter is the same. In section: 12.8 Discussion in Relation to Cross-case Analysis: I will present the overall findings of the analysis of Copenhagen Airport in relation to the Cross-case Analysis (see Chapter: 11). Copenhagen Airport is the main motivation and driver for this thesis, as I will based on my research questions and the analysis of the international cases give input to how Copenhagen Airport can develop its position as hub airport.

As argued for in my cross case analysis one of the main drivers for developing hub airports is political willingness and attention towards aviation. In this chapter, I will among other elements, argue for that despite there the last decades have been several publications addressing some of the challenges and risks that Danish aviation is facing, the political attention the last decades have been – relatively to other transport forms – very low and an almost absent. Even though the political attention have increased the last years, Copenhagen Airport future as hub is still under pressure. Based on the findings and reflections in relation to my other international cases, I will in this chapter unfold my recommendations and suggestions.

As in previous chapters, I will this chapter analyze the production of aeromobilities through the lenses of Policies and Materialities. I have identified a discourse based on articulations and practices that I label: *Growing political attention in a complex situation***.** The complex situation must be understood in relation to the transformation the aviation industry have undergone for the last 30 years, where new airline business models that have made airlines becoming more *footloose* and consequently the airports role as solely passive infrastructure provider have change to be come a potential strategical instrument in generating connectivities. Further, the main hub carrier: SAS at Copenhagen Airport had an increasingly focus on direct flights to destinations from Scandinavia, which historically have been a natural feeder market for Copenhagen Airport. This decentralized focus is a natural development due to market demand and new efficient aircrafts especially on short-haul destinations. Disregard of this development that challenge the connectivity development to and from Copenhagen Airport, the historical political attention towards this development has been vague.

The political discourse that I have identified articulates the shift towards a growing focus on aviation. There has been a historical political focus on rails, but the stakeholders have influenced politicians to link domestic development with aviation and therefore, the last couple of years have fostered an increased political understanding of aviation as a strategic instrument. The political attention directed toward the airport and aviation in Denmark as strategical instrument has historically been quite low – especially in comparison to the Netherlands and Finland. Within the political system, there has been a long tradition on the focus of the train system and less focus on aviation. However, since 2015 there has been an increased political awareness due to the development of the new newly published national aviation strategy in 2017: *Aviation Strategy for Denmark* (Ministry of Transport Building and Housing et al., 2017). Since 2005, two other strategy papers have been published, but these strategies were not published by the government, and therefor they have not had the same political attention as the newest strategy, which promotes a very strategic focus on the development of aeromobilities in Denmark. There are several explanations for this low political attention, but the lack of a *burning platform* and the complexity of aviation could be among the top reasons.

As I have argued in my previous case, hub airports are strongly influenced by dynamic causalities between Policies and Materialities. And an important dimension in this dynamic is the local and regional relations - both in relation to their geographical location (see case of Zurich and Brussels), but also due to national setup (see case of Brussels). Copenhagen Airport has a strong local geographical position in order to facilitate the production of aeromobilities. This is due to the historical spatial planning in the local area and the layout of the runways that limits the externalities, especially in contrast to the case of Amsterdam, Brussels and Zurich.

In relation to the development of the governance model for hub airport, there are different elements that I have identified during my research of the other airports. I will return to this in section: 11.8 Discussion in Relation to Cross-case Analysis, where I also will elaborate on how I can relate the findings in my cross case analysis to my findings in this case concerning Copenhagen Airport.

12.2 COLLECTING DATA

As stated in my introduction, I have worked in the company Copenhagen Airports A/S from 2007 to 2015 in various positions – ranging from analyst in relation to charge negotiations to senior financial analyst with focus on the financial impact of the investment plans and strategic development. Throughout these years, I have developed a professional network that has provided a solid basis for my interviews. In addition, I have further developed my professional network in the process of working on this PhD. I have used these networks as a foundation to establish contact

with the stakeholders I wanted to interview in order to understand how Copenhagen Airport is situated in a nexus of Policies and Materialities.

During October and November 2017, I interviewed seven stakeholders. I have collected interview data in line with my other cases: representatives from the airport, the main airline and the regulator. Along the way, I did interview other key stakeholders, such as representatives for Danish business communities and labor unions, along with the form transport minister. In all I conducted interviews with the CEO from Copenhagen Airports A/S, the Executive Vice President and COO for Scandinavian Airline Systems, the former Transport minister and the current member of parliament in Denmark, the President for trade union 3F-Kastrup, the General Director for Danish Transport, Construction and Housing Authority, who also holds the Danish CAA, and representatives from the Danish Chamber of Commerce.

During my process of interviewing stakeholders, I did also try to obtain interviews with Danish aviation journalists, consultancies and other stakeholders. These interviews were never conducted, either because of cancellations from the interview persons or because of a positive response received after my deadlines had already passed. My interview samples included the following individuals. The CEO for Copenhagen Airports, A/S Thomas Woldbye who has had his current position since 2011. Before this Woldbye worked in A.P. Møller Mærsk in various management positions around Asia and Europe and as CEO at Norfolkline Group in the Netherlands. COO for SAS, Lars Sandahl Sørensen who has held this position since spring 2015. Prior to this Sørensen was employed as ISS world as CCO. From 2003 to 2010, Sørensen did work for SAS in different management position, later as CCO for the SAS group. For seven years, Lars Sandahl Sørensen held positions including CEO and CCO at the Danish tourism organization VisitDenmark. Former Transport Minister and current member of Danish Parliament for The Liberal Party, Hans Christian Schmidt. From spring 2011 to fall 2011 and again from summer 2015 to fall 2016 Schmidt held the office as Transport minister. Furthermore, Schmidt is a member of The Transport, Building and Housing Committee, a standing committee within the Danish Parliament. Henrik Bay, President for trade union 3F-Kastrup, has worked 25 years within the labor unions in various positions. The last 10 years, Bay has held the position as president at the local division of 3F, which is the largest Danish trade union. Aviation is one of the main focuses for 3F in Kastrup. Carsten Falk Hansen, Director at Danish Transport, Constructing and Housing Authority, which also includes Danish Civil Aviation (CAA). Hansen has been director for the Danish airport Regulation and Inspection Authorities[144] related to the Danish aviation

[144] As stated on the webpage: "*The Transport, Construction and Housing Authority's Centre for Civil Aviation undertakes safety-related regulation of safety in relation to civil aviation's infrastructure, such as civil aviation services and airports, with their related systems." (Danish CAA, 2018). Along the safety regulation the Danish CAA is also the responsibility for financial regulation of airports in Denmark. However, it is only Copenhagen Airports that applies to BL*

sector since 2010. In addition Hansen is also observer at the *Growth Committee* at Copenhagen Airport, which is the only officially aviation stakeholder forum to strengthen Copenhagen Airport (See more later in this chapter). Christoffer Greenfort, Senior Consultant at Danish Chamber of Commerce, where he, since August 2016, worked with transport and infrastructure. In addition, Greenfort has previously been Secretary General at Board of Airline Representatives Denmark. Jesper Højte Stenbæk, Director of Policy for Transport and Infrastructure at Danish Chamber of Commerce. Since 2004, Stenbæk has worked with logistics, infrastructure, and as Chief advisor, and since 2015 he has been responsible for developing and implementing transport, logistic and infrastructure policies.

Below is an illustration of those I have interviewed and documents related to the Danish case:

Interview persons	Title	Company/Organization	Representing
Lars Sandahl Sørensen	COO	SAS	Airline
Thomas Woldbye	CEO	Copenhagen Airports	Airport
Hans Christian Smith	Danish MP - former Transport minister	Danish Parliament	Politician
Henrik Bay	President	3F-Kastrup	Union
Carsten Falk Hansen	Director	Danish Transport, Construction and Housing Authority (TBST, CAA)	Civil Aviation Authorities
Cristoffer Greenfort	Senior Consultant	The Danish Chamber of Commerce	Business
Jesper Højte Stenbæk	Director of Policy for Transport and Infrastructure	The Danish Chamber of Commerce	Business

Table 16: Interviewed persons for the Danish case about Copenhagen Airport

Document	Topic	Type	Year
Danish Aviation 2015	Strategy	Ministry publication	2005
Report from Danish Aviation Committee	Strategy	Report from Committee associated to Ministry of Transport	2012
Aviation Strategy for Denmark	Strategy	Government strategy	2017
Annual report and press releases	Company review	Company report - Copenhagen Airport	Various 2007-2017
Annual report and press releases	Company review	Company report - SAS	Various 1992-2017
Various back ground analytical documents	Analysis	Consultancy reports	2004, 2018
Various legal documents	Laws	Legal documents	Various 1981-2018

Table 17: Documents used to gain understanding of the Danish aviation sector

In the next section, I will elaborate on the history of Copenhagen Airport.

12.3 HISTORY OF COPENHAGEN AIRPORT

Back in 1925, the Copenhagen Airport was founded, as one of the first civil aviation airports in the world. The airport was and is still located on the island Amager just

9-15 "Regulations on Payments for using airports (airport charges)" (Danish CAA, 2017). Elaboration on BL 9-15 in section: Policies dimension.

outside Copenhagen. At that time, people went on Sundays out to the grass fields near Kastrup to see flying machines. Later in 1939, the construction of a new airport terminal designed by the Danish architecture: Vilhelm Lauritzens took place. (Copenhagen Airport, 2010d).

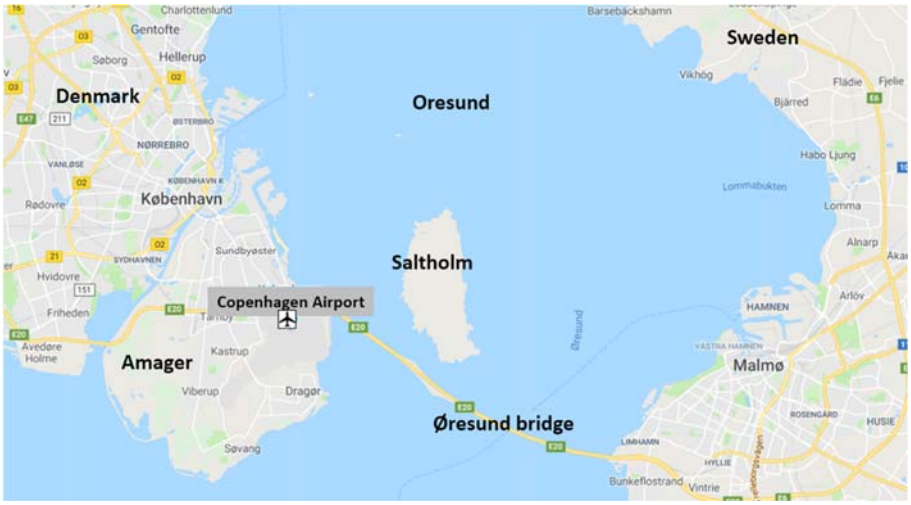

Figure 35: Copenhagen Airport is located at the island Amager just outside Copenhagen. The airport is linked up to the highway and train system related to the Øresund Bridge connecting Denmark and Sweden (Google Map, 2018f).

During WWII, most civil aviation activities were on hold and German soldiers, who fortified the airport, occupied the airport. In 1941 the first concrete runways were constructed, and that was the start of a complete runway system with four runways in concrete and several taxiways. In contrast to Brussels Airport and Schiphol Airport (as addressed previously in their respective cases); Copenhagen Airport was not damaged during the war, and therefore the airport was at the end of WWII one of the most modern and operationally functional airports in Europe.

In the years after the WWII, Copenhagen Airport became the third largest airport in Europe with nearly 300.000 passengers. In 1954, the first polar route from Copenhagen Airport to San Francisco by SAS opened and by the end of the decade, the passenger numbers increased to 1.500.000 (CPH data). The international route to San Francisco was the beginning of a new era of Copenhagen Airport as transfer hub for SAS international traffic. In addition to the adventurous geographical location between Scandinavia and Europe, SAS did inter an agreement with IATA that made it possible to offer Trans-Atlantic passengers a free ticket to another European city when transferring in Copenhagen Airport (Cortzen, 2000, p. 131). In order to accommodate this development, Copenhagen Airport initiated an extensive infrastructure development program including a baggage-sorting facility, a new

terminal with fingers, and an expansion of the runways. During the 50s, jet aircrafts were introduced with significant noise challenges for the local inhabitants, and the passenger growth continued throughout the 60s, stimulated by the charter companies that made it possible for Scandinavians to travel to the southern part of Europe on vacations. At the early start of the 1970s, the extensive infrastructure program was completed, and passenger numbers reached 8 million (CPH data) (Copenhagen Airport, 2010b).

After the rapid passenger growth in the 1970s and the associated noise externalities from the jet aircrafts, there was a public debate surrounding the construction of a new airport located on the island Saltholm in Øresund between Denmark and Sweden[145]. After extensive evaluation of the project and since new jet aircrafts were built to be quieter, the Danish Parliament abandoned the expansion plan on Saltholm in 1979 (Cortzen, 2000, p. 175), and decided to expand Copenhagen Airport in order to facilitate 20-22 million passengers by 2000[146]. This decision from the Danish parliament initiated a new expansion plan with a focus on transfer passengers. This included a modernization of the airside transfer center with a focus on comfort for transfer passengers in order for Copenhagen Airport to become the transfer passengers' favorite airport, along with a new shopping center and expansion of the domestic terminal and the International terminal. As I will elaborate on later, the focus on the expansion of the airport at its current location not only included infrastructural development, but also new spatial planning for the surroundings with restrictions on where new housing areas could be constructed see: section: 12.5 The Policies Dimension. In the 1990s, the expansion plan continued due to the further passenger increase that had reached 12 million passengers at the beginning of the decade (CPH data). In 1998, the new Terminal 3 was inaugurated and contained new arrival facilities, a baggage-sorting facility and a train station. The train station was part of the landside infrastructure, including highways related to the Øresund Bridge between Denmark and Sweden inaugurated in 2000 (Copenhagen Airport, 2010b).

After the inauguration of Terminal 3, the capacity expansions continued with a new airside transfer center for transfer passengers in 2005. The purpose was to support the transfer process by providing facilities where transfer passengers could relax and be assisted with their bookings. In 2007, a new security facility was inaugurated to facilitate further increase in passenger that now reached 21 million. A new metro station became operational and the airport was now linked up with the metro system in Copenhagen with a travel time of only 14 min. to the city center (Copenhagen Airport, 2010c). In 2010, Copenhagen Airport constructed a new low-price facility,

[145] In order to relief Copenhagen Airport for some capacity pressure, the Danish parliament decided to build Roskilde airport 30 km south-west of city of Copenhagen.. The airport was inaugurated in 1973 and is used for different forms of GA. The airport is today owned and operated by Copenhagen Airports A/S (Cortzen, 2000, p. 217].

CPH GO, to accommodate a low cost airlines business model (Copenhagen Airport, 2010a, p. 10).

After continued infrastructure development in the 2010s including expansion of check-in facilities in Terminal 2 and the baggage-sorting facilities (Copenhagen Airport, 2014a, p. 19), in 2014 Copenhagen Airports presented a new growth plan: *Expanding CPH* as part of the World Class Hub strategy (I will elaborate further on the World Class Hub strategy in section: 12.5.4 Copenhagen Airport's strategies). The growth plan includes infrastructural investments for the airport to facilitate passenger volume up to 40 million passengers – in 2014, the actual passenger number reached 25.6 million. The annual report for 2014 articulates that *Expanding CPH* has to take place in collaboration with "*airlines, politicians, tourist organizations, unions and business corporations*" (Copenhagen Airport, 2015, p. 4). The growth plan *Expanding CPH* does not specify details but has to meet an estimated capacity demand of 40 million passengers, which could include expansion of terminals by 60-80%, aircraft stands by 50-70% and the aircraft area by 100%-120%. The principle for the expansion will be based on a one-roof terminal with a flexible infrastructure and a smooth travel experience. The plan will be dynamic and implemented in phases in order to meet the actual demands (Copenhagen Airport, 2014b, p. 12). The plan does not have an associated timeline, and can therefore more be considered as a practical approach to address future capacity demands, than a proactive growth plan. This distinction can be routed in the fact that future demand is to some extent unknown and regulatory setup were existing airlines and other stakeholders to some extent are influencing the level of investments.

Most recently, in 2017, Copenhagen Airport increased the capacity in the central security facility, modernized Terminal 3 Landside in order to improve passenger flows, which included constructing a bridge for passengers to reach security directly from the metro station without interfering with other passenger flows (Copenhagen Airport, 2016, p. 31)

12.3.1 PROCESS TOWARDS PRIVATIZATION OF COPENHAGEN AIRPORT

An important component in the history of Copenhagen Airport is the privatization of the airport. Therefore, I will elaborated more on this in the forthcoming section. The development towards privatization and commercialization can be seen in Denmark where Copenhagen Airport became a publicly listed company in 1990 (Cortzen, 2000, p. 39). In the preceding process of a potential privatization of Copenhagen Airports A/S, the Danish Government formed a committee with the purpose to evaluated potential problems, advantages and disadvantages of a privately owned airport. One of the challenges with privatization was how to handle the ownership structure in order maintain attention to the importance of the airport as an important infrastructure. The committee suggested a limitation of how many shares one individual or an

organization could own. Furthermore, the concept of a 'golden share' was suggested. This would give the government a veto related to significant changes such as potential divestment of the airport or hostile takeovers. These two suggestions were inspired by the British law developed in relation to the privatization of British airports (Cortzen, 2000, p. 19).

Beside the recommendations from this committee, there were political considerations regarding the privatization. On one side there was a general political trend, that some public companies should be managed on market conditions in order for the company to be able to adapt to the market and conduct business with a more rational and sound mindset. Additionally, the airport management saw an opportunity to liberate the airport from the central state funding for new facilities. Instead, the airport would be able to finance new facilities on the private market (Cortzen, 2000, p. 20-21). On the other side, there was an awareness of the importance of the airports as a vital national infrastructure. Finally, the company Copenhagen Airports A/S was founded on the 19 September 1990 (Københavns Lufthavne A/S, 2005).

Initial, only 25% of the shares were to be sold publicly, the rest of the shares were still to be owned by the Danish state (Cortzen, 2000, p. 39). In 1994 it was specified in the articles of association for Copenhagen Airports A/S that no one except the Danish state was allowed to own more than 10% of shares (Ministry of Transport and Building, 2005, comment 2.1). Based on this setup it would be possible for the Danish state to control the airport even though the airport was operating on market conditions. Consequently, the Danish state sold shares in 1996 to lower their owner share to 51%. In 2000, the state reduced its ownership to 34%. However this percentage was gradually increased due to two share buy-back programs to the current ownership ratio of 39.2% (Danish Ministry of Finance, 2005, p. 1)

In 2000, the EU Commission requested the Danish state to remove the ownership restrictions of 10% since this element was in conflict with the Single European Market. The Danish government disagreed, but after two test cases at the European Court of Justice: EU Commission versus Great Britain and Northern Ireland (*trial: C-98/01*), and EU Commission versus Spain (*trial: C-463/00*), the court stated that the member states cannot impose any ownership restrictions (Ministry of Transport and Building, 2005, comment 1). Based on these rulings, the Danish state was willing to adjust the articles of association, and as a directly consequence the Danish state suggested removal of any ownership restrictions from the articles of association at the general assembly for Copenhagen Airports A/S in 2004. The suggestions were hereafter implemented restrictions (Ministry of Transport and Building, 2005, comment 1)

In 2005 Macquarie Airports Copenhagen ApS (MAp Copenhagen)[147] proposed a tender offer to the shareholders with a premium (Copenhagen Airports A/S, 2005). The tender offer process ended when MAp Copenhagen bought 52.4 % of the shares, while the Danish state owned 39.2% and the rest of the shares were held by private and institutional investors (Copenhagen Airport, 2006, p. 42).

The interesting aspect of this development is that initially the Danish state wanted an airport operating on market conditions, while still maintaining the control of the company. This approach can be in light of the development within the political development as described in section: 6.2 Governance, where I elaborate on the trend from a governmental to a governance approach. This approach was disrupted by the request from the EU to remove the ownership restrictions. Consequently, this change in articles of association made it possible for the MAp Copenhagen to acquire the airport with the support from the board of Copenhagen Airports A/S which recommended that the shareholders accept the offer.

MAp Copenhagen was initially in 2005 owned by Macquarie Airports. Over the years, there have been some changes in the underlying ownership structures: In 2009, Macquarie (MAp) and Macquarie European Infrastructure Fund III (MEIF3) became owner (50/50) of the 53.7% shares via the company Copenhagen Airports Denmark A/S (CAD) (Copenhagen Airport, 2010a, p. 48). In 2011, MAp left the ownership of CAD and Ontario Teachers' Pension Plan (OTPP) from Canada took over (Copenhagen Airport, 2012, p. 26). As part of this process, 3.9% of the shares possessed by NAISA owned by MAp were transferred to CAD. In 2017, MEIF3 decided to sell its share of CAD (Copenhagen Airport, 2018, p. 13). In this process, the Danish pension fund ATP chose to acquire a part of CAD and therefore, CAD – which owns of 59.35%[148] of the shares in Copenhagen Airports A/S – is now owned by the Canadian pension fund OTPP and the Danish pension fund ATP[149].

Since the establishment of CAD, where there have been two owners, first MEIF3 and OTPP and more recently ATP and OTTP, the owners of CAD have signed "*a*

[147] Macquarie Airports Copenhagen ApS was at the time a wholly owned subsidiary of Macquarie Airports. which in 2005 was an airport fund with active ownerships with significant investments in 6 airports across Europe and in Australia: Brussels, Rome, Sydney, Copenhagen, Birmingham and Bristol (Davis Polk & Wardwell (Law firm), 2005; Københavns Lufthavne A/S, 2005).

[148] Based on: "Copenhagen Airports Denmark ApS announces the final results of the mandatory tender offer for the shares in Copenhagen Airports A/S" see: https://cph-prod-cdn.azureedge.net/493438/globalassets/8.-om-cph/6.-investor/selskabsmeddelelser/2017/storaktionarmeddelelser/announcement-final-results-230118.pdf Located 13 September 2018.

[149] I do not have full information regarding how the actual ownership distribution within CAD has changed over the years. Due to the scope of this thesis, I will not elaborate further on the underlying ownership structure of CAD and other holding companies.

shareholders' agreement" where the two parties have to agree on all substantial decisions[150].

This agreement also implies that the Danish government has not been able to actively influence board decisions even though they own 39.2% percent of the shares of the company. However disregard of this shareholder agreement and the government ownership, the Danish Government have not had an intention to have an active leadership of the airport, as the former Transport Minister articulates: "*No, not that we should have active political leadership for the airport. We haven't had active leadership at the airport. There hasn't even been any political discussion about it. Never! That's been going on since the beginning." (Danish MP — former transport minister, 2017: 36:29)*

The consequences of a development in ownership structures from being a public owned infrastructure to a privately owned infrastructure can be many. One dimension is a natural increased focus on shareholder value, and by this a focus on both revenue and cost developments, depending on perspective such a development can be perceived differently - as addressed previously in section 6.2.2
Governance – a Bridge Between Market and State. The Danish pension fund ATP, bought a significant part of Copenhagen Airport in 2017, how will affect the airport is unknown.

[150] Based on review of Copenhagen Airports A/S annual reports from 2009 to 2017 – see for example: (Copenhagen Airport, 2018, p. 125] or (Copenhagen Airport, 2010, p. 64]

12.4 COPENHAGEN CONNECTIVITY

In Denmark there was in 2017 eight airports with scheduled traffic with a total of 21.5m departing seats. The airports vary in size and function. The largest airport is Copenhagen Airport (CPH) with 18.3m departing seats (85% of all departing seats in Denmark), while Billund Airport (BLL) in Jutland has 1.6m departing seats, and the third largest airport was Aalborg (AAL) located in the northern part of Jutland with 1.0m departing seats. In addition, Aarhus Airport (AAR) had 0.3m departing seats, Rønne Airport (RNN) at Bornholm had 0.2m, Karup Airport (or Midtjyllands Lufthavn) (KRP) and Sønderborg Airport (SGD) had 0.1m departing seats, and finally Esbjerg Airport (EBJ) had less than 0.05m departing seats (SRS seat data)

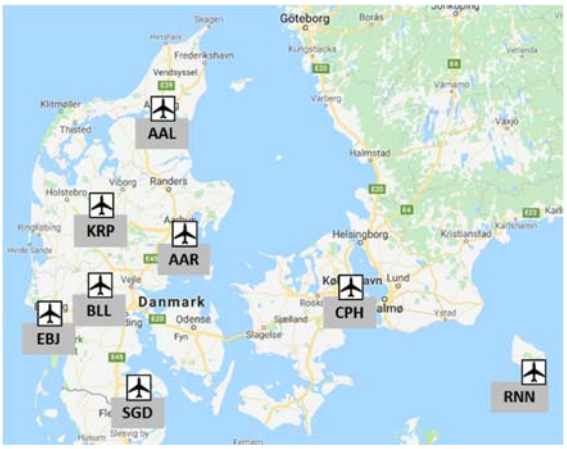

Figure 36: Illustration of the 8 airports in Denmark – where the largest is CPH 85% of all departing seats (2017) (SRS seat data). (Google Map, 2018b)

In addition to this and coming elaboration of the traffic and connectivity development - see Appendix F. Case of Copenhagen Airport, for graphical presentation of major traffic trends.

Of all the departing seats in Denmark in 2017, 14% of traffic is within the domestic market, 77% are towards European destinations and 9% are long haul traffic. The long-haul segment from Denmark constitutes 1.9m departing seats in 2017, and in contrast, the long-haul segment in the Netherlands constitutes 11m departing seats and 29% of all seat capacities (SRS seat data). From 2008-2017 the level of traffic has a growth rate of 2.4% (CAGR), where Copenhagen Airport has a growth rate of 2.3% (CAGR) and in contrast Billund Airport and Aalborg Airport have a growth rate of 4.0% (CAGR) and 4.2% (CAGR) (SRS seat data).

In 2017, Copenhagen Airport is the largest airport and function as international hub for long-haul traffic with 99% of all long-haul traffic from Denmark, for European connections and domestic traffic. Billund Airport primarily serves European and domestic market and has a single long-haul route to Egypt, while Aalborg Airport only serve European destinations. In 2017, in Copenhagen Airport, the largest carrier is SAS with 38% of all departing seats, Norwegian has 19% and Ryanair has 6% of all departing seats. In Billund Airport, Ryanair has 21% all departing seats, while

KLM has 14% and Lufthansa and SAS each have 11%. In Aalborg Airport, the largest carrier is Norwegian with 49%, then SAS with 31% and KLM with 14% (SRS seat data). This distribution of traffic across Denmark illustrates that Copenhagen Airport has a significant influence on how Denmark is connected to the long-haul destinations, however the regional airports are also vital for connections to Europe and within Denmark.

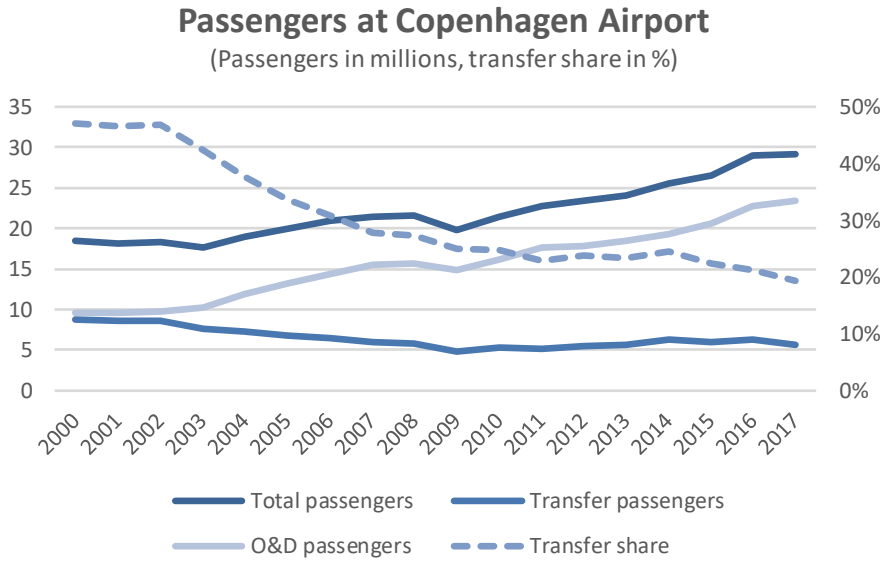

Figure 37: This illustrates the development in total passengers and transfer passengers in Copenhagen Airport. Since 2000 Copenhagen Airport has had a declining trend in transfer passengers from 8.8m in 2000 to 5.7m in 2017 (-35%), and transfer share decrease from 47% in 2000 to 19% in 2017. Note: Transfer passengers and the associated transfer share from 2000-2008 are based on estimates (CPH data) (This Figure is the same as Figure 1 in Chapter 1) .

In 2017, Copenhagen Airport had 29.2m total passengers, and a transfer share of 19.4% (Copenhagen Airport, 2018, p. 11). Since 2008, Copenhagen Airport has had a growth of 7.6m total passengers, or growth rate of 3.4% (CAGR).

In contrast, Amsterdam Airport had a growth rate of 4.2% (CAGR)[151], while Zurich had: 3.2% (CAGR)[152], Helsinki had 3.9% (CAGR)[153] and Brussels had 3.3% (CAGR)[154].

The development in transfer passengers had since 2000 had a declining trend. In 2000, Copenhagen Airport had 8.8m transfer passengers, and in 2017 5.7m transfer passengers, which is a decrease of 3.1m transfer passengers or decrease of 35%. The associated transfer share had decreased from 47% to 19% in 2017 (CPH data). This development in transfer share is due to a decrease in transfer passenger, but also an increase in total passengers. The decreasing trend in transfer traffic did in 2009 stop, and since then the level of transfer passengers has been relatively constant of approximately 6m transfer passengers[155]. When the overall level of passengers increases, and there is a constant level of transfer passengers, the ratio of transfer passengers decreases. While SAS as main hub carrier have decreased its seat capacity in Copenhagen Airport by 5%, the overall seat growth have been nearly 23% from 2008 to 2017 (SRS seat data).

In 2010, as stated in later, in section 12.5.4, in relation to the Dual Airport strategy, Copenhagen Airport did sign strategic partnerships with SAS and Norwegian with a focus on development of the transfer product in Copenhagen Airport, this could be seen as a reason why the decline in transfer traffic did stop. Along these strategic partnerships, Copenhagen Airport did inaugurate the GO facility that offers a simpler airport facility, and in return for efficiency requirements for airline, airlines are able to operate from the airport at a reduced cost (Copenhagen Airport, 2011, p. 10). Initially, easyJet operated from the GO facility, and later more airlines started operating from GO facility and in 2015, Ryanair did start its operation.

These strategies from Copenhagen Airport – the *Dual Airport* strategy and the later *World Class Hub* strategies – can be seen as drivers for the development in traffic. The same year as the *Dual Airport* strategy was implemented with a focus on network airlines, the decline in transfer passengers did stop. However, the focus on low cost airlines may potentially also contribute to the relative dilution of the hub, due to an increase in the overall traffic level.

SAS as main hub carrier in Copenhagen Airport is essential for long haul traffic as well for an extensive European feeder network. In 2017, SAS had 39% of all long haul destination capacities from Copenhagen Airport; in contrast to 2008, this ratio

[151] See: (Royal Schiphol Group, 2018b)

[152] See: (Zurich Airport, 2009a; Zurich Airport, 2013; Zurich Airport, 2017a; Zurich Airport, 2018a)

[153] See: (Finavia, 2018b)

[154] See: (Brussels Airport, 2017h)

[155] Level of transfer passengers in Copenhagen Airport 2012-2017 (million): 2012: 5.5, 2013: 5.7, 2014: 6.4, 2015: 6.0 2016: 6.3, 2017: 5.7 (CPH data)

was 58%. SAS has on long haul destinations increased they capacities with 16% from 2008 to 2017, while the total long haul capacities have increased by 72%, due to other airlines entering the market (SRS seat data).

Copenhagen Airport's primary hub function has been and still is for traffic between Scandinavia and Europe due to the geographical position of the airport (see: Figure 10). In 2017, 69% of transfer traffic was between Europe and Europe, while 31% was transfer traffic between Europe and long haul destinations (CPH data).

Overall, the level of transfer passengers has decreased from 2000 to 2010, and from then on been relatively constant. In contrast, to my other cases, the hub function – measured in terms of transfer passengers – have been relatively diluting, since these airport hubs (particular the cases of Schiphol and Helsinki) have had an increase in transfer passenger over the same period. This relative dilution of the hub function will potentially have consequences for the possibility to provide feeder traffic for direct long haul connectivity.

Transfer traffic is essential to maintain direct long haul destinations. In 2017, there were 26 long haul destinations served from Copenhagen Airport full year (SRS seat data), where on average 35% of the passengers were transfer passengers (MIDT data). Latest, in 2018, there has been an increased in long haul traffic from Copenhagen Airport with 11% from January – August (CPH data). Despite, this development; the transfer passenger foundation for long haul traffic has not developed.

As stated previously, in relation to other hubs, this lack of transfer passenger development dampens the potential for direct long haul traffic and therefore the global reach for Denmark. The dilution of the hub, due to the transfer passenger, is additional under pressure, since other network carriers such as Emirates, Qatar Airways along KLM, and Lufthansa offers e.g. long haul connections via their respective hub airports. This development do to some additional extent challenge the passenger foundation for providing direct long haul destination from Copenhagen Airport.

The overall diluting trend of Copenhagen Airport as hub is also illustrated in ACI Europe Connectivity Reports. From 2008 to 2017 the *Airport connectivity* has increased by 23%, however this constitutes of a growth in *Direct connectivity* of only 0.7% and a development in *Indirect connectivity* of 36% – which also illustrates the development of increased connections via other airport hubs. The *Hub connectivity* development by the NetScan model has over the same period decreased by 30% (ACI Europe, 2014; ACI Europe, 2015a; ACI Europe, 2016; ACI Europe, 2017a). This declining trend is in line with development of transfer passengers in Copenhagen Airport, even though the NetScan model is evaluating possible connections and not development in actual transfer passengers. It is important to note that the NetScan model is evaluating developments over a decade, and therefore the model does not

adjust for the development the last 8 years where transfer traffic in Copenhagen Airport has had a relatively constant level in number of transfer passengers.

Depending on points of view, the historical trend with fewer transfer passengers in Copenhagen Airport, can be understood differently. However, in terms of hub function, Copenhagen Airport has declined, which is challenging the direct connectivities to and from Denmark.

As illustrated in my previously cases, there are different policies towards hub airports related to various materialities and founded in discourses and rationalities. In the sections to come I will evaluated the production of hub airport and aeromobilities in Denmark in order to understand the driving forces behind the current situation in Denmark and propose different initiatives to develop the aviation further in Denmark.

12.5 THE POLICIES DIMENSION

In this section, I will elaborate on the legal framework for the production of aeromobilities in Denmark, and the aviation strategies which have been developed since 2005 and which from a political position have tried to frame the development in various ways.

The *Air Navigation Act* which is based on the Chicago convention, stipulates the overall framing of aviation in Denmark such as airlines registrations of nationalities and permissions, e.g. to operate aircraft and airports, including the purpose of the airports as *Air Navigation Act* states in § 57:

> *"Airports that are of vital importance to Denmark's national and international traffic connections… must ensure that the airport at all times covers Denmark's requirements for national and international, including intercontinental traffic, by providing the necessary capacity for air traffic*[156] *(Transport- Bygnings- og Boligministeriet, 2017a, § 57)*

This framing stipulates that airports including Copenhagen Airport needs to provide enough capacity to fulfill Denmark's requirements. This articulations is not very specific in terms of what kinds of requirements the state of Denmark has, however as

[156] Own translation of: "*Flyvepladser, som er af vital betydning for Danmarks nationale og internationale trafikforbindelser… skal sikre, at flyvepladsen til enhver tid opfylder Danmarks behov for nationale og internationale, herunder interkontinentale, trafikforbindelser ved at kunne tilbyde den nødvendige kapacitet med hensyn til afvikling af lufttrafik*" (Transport-Bygnings- og Boligministeriet, 2017a, § 57]

I will elaborate later, the *Aviation strategy for Denmark* from 2017 and *BL 9-15* from 2017, states that Copenhagen Airport needs to support hub function for airlines.

In addition; the *Act regarding Copenhagen Airports A/S*[157] (Transport- Bygnings- og Boligministeriet, 2000) that is the foundation of the establishment of the company Copenhagen Airport A/S, stipulates the purpose of Copenhagen Airport A/S: "*The company's purpose is to own, operate and expand the airports in Kastrup and Roskilde. The company must develop the airports that are necessary to promote and ensure air traffic to and from Copenhagen*"[158]. After a revision of the *Act regarding Copenhagen Airports A/S* in 2001, the responsibility for the stately ownership of Copenhagen Airports A/S was transferred from the Ministry of Transport- and Energy to the Ministry of Finance in order to separate the ownership and the regulatory authority (Transport- og Energiministeriet, 2005, p. 89). Further, the *Act regarding Copenhagen Airports A/S* articulates: "*The company may establish, acquire and operate such business, which has a commercial and geographical connection with the operation of the airports"*[159]. The focus on airport related activities is further stipulated in paragraph 3 in *Expansion Act of Copenhagen Airport* (Transport- Bygnings- og Boligministeriet, 1992), which states that land use at the airport must be connected with the operation of the airport. This act lay out the foundation for regional, municipality and local spatial plans framing the acceptance of development plans for Copenhagen Airport. The focus on airport related activities could potentially dampen some of the development plans for Copenhagen Airport, since they specify certain activities in different areas of the airport. As I will illustrate later in section: 12.5.3 these airport related activities criteria for development of the airport will potential be relaxed, as the Danish Government will investigate the possibility of easing these requirements. As I addressed previously in section: 12.3, the plans for reallocation of Copenhagen Airport to the island, Saltholm in Øresund was abandoned in 1979 (Cortzen, 2000, p. 175). Consequently, the initial act of: *Expansion Act of Copenhagen Airport*, was adopted in 1980, which specified the expansion of the airport (§3). Further, it was articulated that the certain existing noise exposed housing areas within a given threshold of noise could receive state subsidies for sound isolation projects (§4) (Transport- Bygnings- og Boligministeriet, 1980). In 1981, in line with the wording in the *Expansion Act of Copenhagen Airport* concerning the environmental effects on the surrounding areas, it was legally articulated that different areas outside the airports should not be used for new noise-sensitive housing

[157] Own translation of "*Bekendtgørelse af lov om Københavns Lufthavne A/S*" (Transport- Bygnings- og Boligministeriet, 2000)

[158] Own translation of "*Selskabets formål er at eje, drive og udbygge lufthavnene i Kastrup og Roskilde. Selskabet skal gennemføre den udbygning af lufthavnene, som er nødvendig for at fremme og sikre afviklingen af lufttrafikken til og fra København*" (Transport- Bygnings- og Boligministeriet, 2000, §4]

[159] Own translation of: "Selskabet kan herudover etablere, erhverve og drive sådan virksomhed, som har en forretningsmæssig og geografisk sammenhæng med lufthavnenes drift." (Transport- Bygnings- og Boligministeriet, 2000, §4 – 2.]

projects.[160]. This restriction was e.g. in 1981 adopted in a spatial plan: *Tårnby Municipality Spatialplan 50 – noise zone around Copenhagen Airport*[161], where it is specified that in undeveloped areas south-west of the airport no new noise-sensitive housing projects were allowed (§4.2.1.1). Further, it was articulated that in the urban areas west of the airport, no new housing projects were allowed on large undeveloped areas (§4.1.1) (Tårnby Municipality, 1983).

This framing of the legal setting for the Danish aviation industry and Copenhagen Airport, illustrates the foundation for infrastructural development of Copenhagen Airport. It illustrates that after the abandon of the reallocation plans of the airport to Saltholm in the late 1979, the political attention towards developing the airport was founded in a concern of the potential conflict between the local inhabitants and the development of aviation and the airport. Due to this political approach, the potential conflicts between the local inhabitants and the airport are kept at a minimum[162] in contrast to other places as illustrated in the case of Amsterdam, Zurich and Brussels. After this short elaboration, I will now in the next section address the different public aviation policies along the different strategies from Copenhagen Airport.

12.5.1 DANISH AVIATION 2015 FROM 2005

In addition to the legal framework for Copenhagen Airport as elaborated in the previous section, which defines the purpose and the overall spatial development for the Copenhagen Airport, there have since 2005 been different public strategies for aviation. In 2005: *Danish Aviation 2015* published by Ministry of Transport and Energy, *Report from Danish Aviation Committee* published by Danish Aviation

[160] See: "Cirkulære om udbygning af Københavns Lufthavn, Kastrup, samt bygge- og anvendelsesregulerende bestemmelser for områder, der er berørt af miljømæssige gener fra lufthavnen." https://www.retsinformation.dk/forms/R0710.aspx?id=49141 – Own english translation: "Directive regarding expansion of Copenhagen Airport, Kastrup, as well as building and use regulations for areas affected by environmental concerns from the airport"

[161] Own translation of: "*Tårnby Kommune Lokalplan 50 – støjzone omkring Københavns lufthavn*" Tårnby is the municipality where Copenhagen Airport is located.

[162] My argumentation for a low noise related conflict between local inhabitants and the Copenhagen Airport is based on the number of noise related complaints received by the airport. From 1990 to 2017 there has been an average of 47 complains per year. In year 2015, the airport did for two months renovate one of the main runways and therefore, the use of the runway 12/30 increased and distributed more traffic towards city of Copenhagen and southern part of Sweden. Consequently, the complaints increased to 354 that year. Adjusting for this outliner, the average of noise-related complaints would only be 35 per year (A. Adamsen, (Copenhagen Airport), personal communication September 13, 2018). In contrast to the case of Brussels Airport (see section: 9.6.2), where the annual complaints are counted in thousands, the level of complaints in Copenhagen Airports seems very low.

Committee in 2012 and *Aviation strategy for Denmark* in 2017 published by the Danish Government.

In the sections to come I will elaborate on these.

In 2005, the Danish Transport Ministry produced the publication: Danish Aviation 2015[163] based on the challenging international competitive environment the Danish aviation industry was facing along the global decline in aviation activities after the attacks events September 11, 2011 in New York. The publication articulates the important of aviation for Denmark in relation to the global business environment, education and tourism (Transport- og Energiministeriet, 2005, p. 3). The publication recognizes that the industry operates on market conditions; however, the intention is to increase the political support to industry. The publication articulates a vision for Danish aviation in 2015:

> "*Danish aviation has an international range. There are many direct flight connections which give citizens and companies in Denmark good opportunities to participate in globalization. At the same time, Denmark has an internationally competitive aviation industry at a continuing high level of safety"*[164]*. (Transport- og Energiministeriet, 2005, p. 17).*

The *Danish Aviation 2015* articulates four objectives for 2015: The Danes must have significantly more international direct routes based on higher frequencies and at a lower price. Copenhagen Airport must be an international hub for air traffic in Scandinavia and the Baltic Sea area. Domestic air traffic must be supported by good frameworks in order to maintain an effective air transport and Danish aviation must be safe, innovative, effective and have in mind new solutions regarding technology, environment and energy (Transport- og Energiministeriet, 2005, p. 17). These objectives were to be supported and reached by eight strategic initiative themes: Denmark has to support mutual legal international frameworks for aviation, the Danish aviation industry needs better financial conditions including lower public administrations fees, and there has to be an improved dialog between the industry and the authorities. Furthermore, the already high security level needs to be balanced between new initiatives and the associated cost, ground transport to the central airports needs to be improved, the authorities need to support initiatives that improve the efficiency and capacity in airports and in the airspace. Requirements for environment and energy focus need to be addressed on an international level to be balanced in respect to environment and to leverage the playing field. Lastly, Denmark should have

[163] Own translation of: "*Dansk luftfart 2015*" (Transport- og Energiministeriet, 2005).

[164] Own translation of: "*Dansk luftfart har international rækkevidde. Der er mange direkte flyforbindelser, der giver borgere og virksomheder i Danmark gode muligheder for at deltage i globaliseringen. Samtidig har Danmark et internationalt konkurrencedygtigt luftfartserhverv på et fortsat højt sikkerhedsniveau.*" (Transport- og Energiministeriet, 2005, p. 17].

the best possible aviation education (Transport- og Energiministeriet, 2005, p. 19). These eight strategic initiative themes are supported by 46 specified initiatives with a focus on legal (national and international) and regulatory aspects of aviation, further there are focus on international and national improved cooperation to improve prove the conditions for Danish aviation along a initiatives to lighten the administrative and financial burden for the sector. There are articulations that the Transport and Energy ministry will support initiatives to support the construction of a metro connection line between Copenhagen City and Copenhagen Airport along an improved highway connection of Billund Airport (Transport- og Energiministeriet, 2005, pp. 65-108).

In contrast to the *Aviation Strategy for Denmark* in 2017 – as I will elaborate later –, the capacity at Copenhagen Airport is articulated as limited in the foreseeable future (Transport- og Energiministeriet, 2005, p. 99), consequently this is not a focal element in this strategy document: *Danish Aviation 2015*. Furthermore, all initiatives[165] were supposed to be initiated by only the Ministry of Transport and Energy, which indicates that the initiatives regarding improving the connectivity to and from Denmark was not thought in a wider political strategical context; this again is different to the *Aviation Strategy for Denmark* from 2017, where the initiatives is founded within the Danish Government.

The initiatives was articulated as foundation for political support to develop Danish Aviation 2015; the report outline three different scenarios for the development of Danish Aviation from 2005 to 2015: The best case is *International range*, than *Regional range* and finally *European Range*, where each scenario is associated with a given level of served destinations and number of passengers. Below I will elaborated on the actual performance from 2005 to 2015.

Even though, the initiatives are presented as stated above, there are no prioritization of the initiatives that would have increased the likelihood for the different scenarios. It is stated that the different scenarios depends on how competitive the Danish airlines are able to become – the more competitive, the greater possibility for reaching the international range scenario, and in this sense, the initiatives should be understood as a way to improve the framework conditions for these (Transport- og Energiministeriet, 2005, pp. 58-59).

The three scenarios has a baseline in 2005, with 120 destinations served from Denmark. Consequently; the different scenarios in 2015 would impose the following developments: *Regional range* has 105-130 destinations (CAGR between -1.3%-0.8%), *European range* has 130-160 destinations (CAGR between 0.8%-2.9%) and *International range* with 160-180 destinations (CAGR between 2.9%-4.1%). Additional it is only in the scenario with *International range* where Copenhagen

[165] Naviair, the Danish air traffic control company, owned by the Danish state was had a strategic ambition to further develop the education of air traffic controllers etc (Transport- og Energiministeriet, 2005, p. 108],

Airport would maintain its position as major international hub (Transport- og Energiministeriet, 2005, p. 57, 59)

Based on my analysis of the performance within the Danish aviation[166], I have found that the number of destinations served in 2015 equals 146, which is a growth of 17% from 2005-2015 or a CAGR of 1.6%. Appling this growth ratio to the baseline of 120 destinations as stated in the *Danish Aviation 2015,* equals 140 destinations in 2015 and therefore the performance for Danish aviation would be within European range. The scenarios do not distinguish between where the future destinations are geographical located, but only refer to a given range of destinations served. *Danish Aviation 2015* also highlights that given the different potential scenarios, the passenger level in Denmark in 2015 could range between 18 million and 40 million passengers (Transport- og Energiministeriet, 2005, p. 58). The total passenger number at Danish airports in 2015 was 32.2 million (Transport- Bygnings- og Boligministeriet, 2018), this alternative approach based on number of passengers does also indicate that the actual performance for the Danish aviation would fall into the European scenario[167].

It important to note that since 2005 there have been different fluctuations of the development of air traffic; e.g. in 2008 due to the international financial crises the aviation industry faced a significant setback. Consequently, the number of destinations served from Denmark decreased by 7.9% in 2009 and hereafter an increased by 11.7% in 2010 (SRS seat data). By applying the low level of destinations in 2009 as baseline for the evaluation, the development in served destinations would

[166] I have not been able to establish a baseline corresponding exactly with the baseline in 2005 of 120 destinations served from Denmark as stated in the Danish Aviation 2015. However, after contact with one of the contributors to the publication, I became familiar with some of the assumptions behind this approach. The approach is based on scheduled and charter passenger traffic. Destinations have to be operated a minimum of 52 times per year and domestic destinations are supposedly included in the data sample (M. Bøgelund, (Incentive), personal communication July 9, 2018). Based on this approach and data (SRS seat data) from SRS Analyzer, the baseline in 2005 is estimated to 125 destinations, and the number of destinations in 2015 equals 146 from all Danish airports: (CPH, BLL, AAL, AAR, RNN, KRP, SGD, EBJ, TED, ODE, RKE). Some of these airports do not meet the above criteria, however they are still within the sample. Airports in Greenland and the Faroe Islands are not included in the sample. It is important to stress that there are various approaches to defining growth rates depending on criteria applied. Alternative criteria could be city code vs. airport code (which I have used), or other threshold of frequencies or number of passengers to define a route or whether to include charter in the sample. I have tried my best to reproduce the methodology used in *Danish Aviation 2015* and apply this in this analysis.

[167] The *Danish Aviation 2015* does not provide any threshold for the Regional, European and International scenarios for passenger levels. The report only provides the threshold for number of destination scenarios. However, the report provides a worst case of 18 million passengers, and 40 million passengers as best case in 2015. Based on the same distribution key as for the destination scenario threshold, the threshold for passengers' scenario is calculated: Regional scenario: 18-25 million passengers, European scenario: 25-34 million passengers and International scenario: 34-40 million passengers.

imply a growth rate equal to CAGR: 3.3% - this corresponding to the projected growth rate within the International scenario. This analysis illustrates that depending on your year of baseline, the development within Danish aviation can be perceived as either within the European or International scenario. However, such a cherry-picking approach is misleading; the most relevant approach would be to evaluate the long-term development from 2005 to 2015, and by such I will still - disregard of yearly fluctuation – evaluate the development as within the European range. It can be discussed whether the number of destinations as a measurement for aviation development is the most relevant approach to evaluate the development of Danish aviation. Since e.g. an evaluation of Domestic traffic development based on number of destinations could be limited due to the fixed number of airports in Denmark, and the same consideration could apply in an international context, where connections to two small remote airport would weigh the same as two large international airports. Therefore, it could be relevant to include number of frequencies in an evaluation, but in order to be true to the scenarios in *Danish Aviation 2015,* I have done my evaluation based on number of Destinations and passengers. An alternative approach to this evaluation could be to evaluate the development in connectivity in relation to a business or tourism criteria in line with the approach in Zurich Airport, where connectivities to business capitals are in focus (See: section: 10.5.2.1). Even though such distinctions can be very difficult to evaluation, a reflection upon could be relevant in order to assess the development in Danish aviation.

The vision in the publication *Danish Aviation 2015* focuses on improved connectivities, especially by a focus to develop Copenhagen Airport as a hub and on domestic traffic. This vision is also supported by initiatives to improved operational international frameworks for the industry regarding cost and legislation. Moreover, the ground transport also needs improvement and there is a focus on aviation education and dialogue. All these strategic initiatives could be understood as a way to improve the operational performance, or as argued for in the section: 2.3 Conventional Aviation Research - the improvement of the performance of the flow machine.

This *Danish Aviation 2015* strategy publication presents some very specific initiatives, however I will argue as stated above that the approach to the development of aviation is not founded on a wider strategical societal foundation involving several other stakeholders and perspectives such as foreign policies or tourism. One reason for this conventional perspective could be due to the reason that aviation historically has had less political attention since everything seems to work. As Director, TBST (Danish CAA) states:

> *"Aviation has gone relatively unnoticed, politically and strategically. The way we understood it, as long as there were no planes falling out of the sky, there wasn't any major political interest in what airline companies did. (Director, TBST (Danish CAA), 2017: 19:52)*

COO at SAS, also addresses the relatively low historical political attention, or passivity:

> *"And in this landscape [of seeing aviation strategically], there's long been some passivity about it in Denmark; it has been known that it was important, but nothing was done. There was no intention to understand what the dynamics are, or what efforts will create a successful infrastructure, or the opposite." (COO, SAS 2017: 14:35)*

And as he further articulates, that passivity could be due to the complexity of the aviation industry:

> "*About this passivity, because, "Gah! This thing [aviation] is so complicated, there's so much on the line, so much effort, so much we can't control, so much EU, so much global politics, so much national economics, big economics. It's so complex, this field, that we simply can't handle it. It'll have to get by on its own (COO, SAS 2017: 20:22)*

The lack of political attention could also be due to the political focus on railways[168] in Denmark, even though the economic benefits might not justify this level of attention, as Director, TBST (Danish CAA) states: *"The politicians and the societal discourse tend to care more about railways than anything else, and I can't really say why. Perhaps it's for some historical or DNA kind of reason or another… In terms of what it means for the economy, and for transport, and so on, it's almost inversely proportional to how much energy we spend on railways. That's just my experience. Don't ask me why, but it is*!" (Director, TBST (Danish CAA), 2017: 22:56).

As illustrated in this section regarding the Danish aviation policy from 2005: *Danish Aviation 2015*, the policies towards aviation was mostly founded with in the conventional perspective where the focus is to optimize the flow machine. The policy is only founded within the Transport Ministry, and it is not seen in a wider political context with local, regional and national stakeholders and politicians. By my analysis in relation to the proposed future scenario for Danish aviation, I have concluded based on the assumption presented in the publication that Danish aviation only has performed within the Regional scenario – the 2nd best scenario of the three proposed scenarios. In the next section I will elaborate on the aviation strategy from the *Danish Aviation Committee* published in 2012.

[168] Even tough there is an articulation of railways as the predominant political focus, the Danish transport policies have also been focusing of development of other means of transport: such as cars, bikes, however the key here is that the political attention toward aviation has been rather limited.

12.5.2 REPORT FROM DANISH AVIATION COMMITTEE FROM 2012

In the 2010, the European airspace was closed for six days due to the Icelandic volcano Eyjafjallajökull emitting ash clouds over major parts of Europe. Consequently, no airlines could operate and air traffic passengers were stranded all over Europe. This sudden interruption of the air traffic system evoked political attention in Denmark, which led to the establishment of the Danish Aviation Committee[169]. The situation for Danish aviation is further articulated as challenging since – among other issues – the ranking of Copenhagen Airport based on number of passengers have dropped from a rank as number 10 among European airports to a rank of number 16, and the hub position have been weakened (Udvalget om Dansk Luftfart, 2012, p. 5). The Committee established by the Danish transport minister in 2011, recognized that there was a need for an overall assessment of the framework generating a more effective and competitive aviation sector in Denmark. The committee did consist of representatives from unions, the aviation industry, and stakeholder organizations. Along this the Minister of Transport appointed seven other members and the chairman and there were establish a support group with representatives from the Ministry of Transport, Ministry of Industry, Business and Financial Affairs along Ministry of Finance. (Danish Transport Ministry, 2011, pp. 1-2).

In 2012, the committee published *Report from Danish Aviation Committee*[170]. This extensive report addresses various aspect of the Danish aviation sector including the main actors such as passengers, airline companies, airports, air navigation services and supplies, including authorities. Along, the report frames some of the economic outcomes from the industry in addition to the domestic and international connectivities[171]. Furthermore, the relation between the environment and aviation is addressed with the global aviation industry producing 2% of the global CO2 emission, while the Danish domestic aviation industry only produces 0.5% of the Danish CO2

[169] Own translation of: "Udvalget om Dansk Luftfart"

[170] Own translation of: "*Redegørelse fra Udvalget om Dansk Luftfart"* (Udvalget om Dansk Luftfart, 2012).

[171] The report from the Danish Aviation Committee, refer to the analytical results from the consultancy publication: "*Der er noget i luften*" [In English: "*There is something in the Air*"] by Copenhagen Economics produced for the Capital Region of Denmark (Copenhagen Economics, 2009). The report analyze Copenhagen Airport based on connectivity approach in line with NetScan model. The report finds that the hub connectivity in Copenhagen Airport is decreasing and based on its analysis, the report articulates five recommendations for the stakeholder in the capital region: (1) Increased route development and promotion of the region (2) Close dialog with Danish Government in respect to monitor connectivity development (3) Contribution to monitoring of charge development (4) Make sure of regional development plans are promoting the airports framework for development (5) Have focus on other framework conditions, such as bilateral aviation agreements. (own translation and interpretation of recommendation) (Copenhagen Economics, 2009, p. 40]. These recommendations was not implemented in the *Report from Danish Aviation Committee.*

emissions. The report highlights how Danish airports are linked to the overall transport system in Denmark, and how there is a continued focus on increasing the Danish mobility in terms of transport infrastructural investments, including rails, roads, and stations. Finally, the report estimates that if Copenhagen Airport loses its hub status for transfer passengers, a drop of at least 25% could be expected (Udvalget om Dansk Luftfart, 2012, pp. 6-7).

The report is here articulating the potential downside of Copenhagen Airport losing its position as a hub. Since publication of the report, the development in transfer traffic and therefore the hub function in Copenhagen Airport has not developed. As presented in the Introduction and Motivation, the level of transfer passengers have been relatively constant around 6.0m since 2012, and the associated transfer share has continued to decrease. In relation to the airports in Helsinki, Amsterdam and Brussels the development of transfer passengers have been increasing since 2012, so in relation to these airports, the hub position have not developed any further.

In the *Report from Danish Aviation Committee*, there are 10 strategic initiatives and recommendations, for improving the Danish aviation sector production of connectivity to and from Denmark; including a focus on Copenhagen Airport maintaining its hub position and competitive position in Scandinavia and in the Baltic region by increased coordination between stakeholders. The domestic air traffic must have an improved framework in order to support the connectivity in Denmark and the Faroe Islands and Greenland. To support the international and domestic connectivity, there is a need for better coordination between the other types of ground transport modes and airports in Denmark. In addition, it is important that airports and airspace are effective and support cost efficient operations for airlines in terms of both capacity and transparent prices. Along this, there are initiatives focusing on environment and energy efficient industry, safety and security in the Danish aviation industry and improvement of aviation education in Denmark. Furthermore, Denmark should work towards transparent, simplified and effectives rules to support level playing field. Finally, the report states that there should be a continued dialogue with yearly reports from the transport ministry regarding recommendation related to current issues" (Udvalget om Dansk Luftfart, 2012, p. 8-9)

Due to the initiative regarding maintaining Copenhagen Airport as hub, the airport established the *Growth committee*[172] in 2012, which consists of members representing Danish companies, Danish tourism, interest groups including unions and stakeholder groups, regional politicians from both Denmark and Sweden, Copenhagen Airport, SAS, academia and Danish Transport Construction and Housing Authority (as observer). The committee has a purpose to identify ideas and initiatives that can promote further connectivities from Copenhagen Airport to the benefit of Denmark and Sweden (Copenhagen Airports A/S, 2018).

[172] See: https://www.cph.dk/en/about-cph/investor/growth-committee

In comparison to the previous aviation strategy: *Danish Aviation 2015,* from 2005*,* the *Report from Danish Aviation Committee,* 2012 also included initiatives in order to generate more connectivities to and from Denmark, due to the difficult situation for Danish aviation including the challenge Copenhagen Airport is facing as hub in relation to other European airport. The initiatives includes some of the same focal points as before, such as that Copenhagen Airport needs to maintain its position as hub in Scandinavia as well as to focus on domestic aviation. The residual initiatives can be grouped into the same categories as the initiatives from the *Danish Aviation 2015*: there is a focus on improvement of ground transport, environment, the legal framing to improve the level playing field, safety and security, Danish aviation education sector, efficient airports and airspace and increased dialog among stakeholders. These initiatives are very logical in order to improve the flow machine. However in line with my former remarks regarding *Danish Aviation 2015*, I will argue that the strategy does not provide motivation to seek a wider strategic approach towards aviation involving a wider political foundation for developing aviation in Denmark – this could point towards a discourse of understanding the aviation as a simple flow machine that need to be optimized. The lack of a wider societal understanding of aviation and hub airports is not addressed. For example, the strategy is only limited to extend to the addressed elements of externalities such as noise and spatial development of airports. There can different reasons for this; however, it is these elements that are argued to be challenges in my other cases such as Brussels, Amsterdam and Zurich, and some attention towards these cases could be beneficial at least in order to acknowledge them as potential risks that could disrupt the development of aviation in Denmark.

Even though aviation is articulated as an important element in the domestic infrastructure, I will argue that due to the geographical dimensions of Denmark, this aviation as a domestic transport form is not needed to the same extent to provide the domestic coherence as I argued was the case in Finland (see Chapter: 8 Case – Helsinki). In addition, aviation could be perceived as a luxury as former transport minister states: "*I mean, maybe because there have been some preconceptions about flying I often hear people talking about jets, and how bad they are for the environment. And people feel like it's a high-society thing." (Danish MP – former transport minister, 2017: 10:12).*

These two viewpoints could exemplify why there is not a wider political attention towards aviation in Denmark.

This point of view is also supported by the former Transport minister of Denmark in response to a wider political attention on aviation in Denmark: "*Whether [aviation policies] are a major topic in Parliament? I would have to say they are not." (Danish MP – former transport minister, 2017: 07:12)* In line with this, it could argue that due

to nature of aviation as an invisible kind of transport. By invisible I will argue that since the transport system to some extent only require physical infrastructure at already established airports – even though these can be significant – the transport system differ from railways and highways in their physical present in the landscape. In addition, the regulatory framework of aviation are in some extent outside the national state (such as ICAO, EU), which also could argue for a low political national involvement. These two latter viewpoints could supplement the argument by the former Transport minister in why aviation is not a major topic in the Danish Parliament.

In Denmark there are different stakeholder groups including representatives from Danish companies, unions, business associations, tourism organisations, authorities and local, regional and national politicians that try to promote different points of view. These stakeholder groups include BDL[173] and the previously mentioned *Growth Committee* and *Danish Aviation Committee.* It is difficult to promote and change policies when the political attention is low, and due to the low political attention, it can be difficult to have political willingness to accept initiatives requiring public funding. Such an example of is stated in *Report from Danish Aviation Committee*: *"it is presupposed that the committee's recommendation does not give rise to public additional expenses*[174]*" (Udvalget om Dansk Luftfart, 2012, p. 13).*

Against this backdrop of low political attention and less political will to increase the public spending related to aviation, in spring of 2015, BDL published a report: *Denmark as an Attractive Aviation Nation*[175]. The report analyses perspectives on Danish aviation including socio-economic effects, value chain participants and different framework conditions. The report argues for the need of a national aviation policy – including strong political commitment and persistent involvement in relation secure the growth in Danish aviation (Copenhagen Economics, 2015, p. 15). This involvement including improved framework should be imposed in order to avoid a worst-case scenario with a potential loss of 15.000 jobs, and where an active aviation policy in the best case scenario could generate 16.000 new jobs - a difference of 31.000 jobs by passive versus active strategical political attention. It was

[173] BDL is a *Brancheforeningen Dansk Luftfart* or *[Trade Organization for Danish Aviation]* (own translation). It was established in 2010 and is a stakeholder organization for Danish aviation companies and part of the Confederation of Danish Industries. The organization has members from airports, airlines and other aviation related organizations (Brancheforeningen Dansk Luftfart, 2018)

[174] Own translation of: "I kommissoriet er det forudsat, at udvalgets anbefalinger ikke giver anledning til offentlige merudgifter"

[175] Own translation of: *Danmark som attraktivt luftfartsland* (Copenhagen Economics, 2015). The reported is published by BDL, but the calculations are conducted by the consultancy firm: Copenhagen Economics. The results are been debated within the BDL, but the conclusions are the responsibility of Copenhagen Economics (Copenhagen Economics, 2015, p. 3].

recommended to focus on three strategic areas of initiatives: Create growth by aviation, Better frameworks for aviation, Support innovation and entrepreneurship within aviation (Copenhagen Economics, 2015, pp. 22-25).

It is difficult to argue for how much influence this report has had on the development of the new aviation strategy for Denmark in 2017 – as I will elaborate on next. However, the report *Denmark as an Attractive Aviation Nation* was distributed to the members of the Business, Growth and Export Committee in the Danish parliament the 20 May 2015[176]. I will therefore argue that this report and its recommendation have been part of the knowledge base for the Danish government when formulating a new governmental strategy: *Growth and development in the entire country of Denmark*[177] published in November 2015 for the purpose of promoting growth and development across Denmark. In this governmental strategy, one initiative: *Growth of Danish aviation for the benefit of industry*[178] focuses on promoting international and domestic connectivities in order to generate growth and jobs in the entire country of Denmark (Danish Government, 2015, p. 32). It is articulated, that Copenhagen Airport has a special position as the aviation hub, and regional airports support this connectivity. Therefore, the Danish government should develop an aviation strategy that, for example, will focus on more effective and competitive airports including attractive competition conditions for Danish airlines (Danish Government, 2015, p. 32).

12.5.3 AVIATION STRATEGY FOR DENMARK FROM 2017

On July 3, 2017, four ministries from the Danish government presented a new *Aviation Strategy for Denmark*[179]. The strategy has, in contrast to previous aviation strategies, a wider socio-economic perspective on the improvement of connectivity to the benefit for Denmark, as Director. TBST (Danish CAA) states this is:

> "*[This is] a strategy for aviation, where you want to maintain and improve the conditions for aviation, not just for the aviation industry, but for Denmark; that is, how can we get more connectivity? Because that's the premise it's really rooted in, I think: the more connectivity, the better it is for the economy.*" (Director, TBST (Danish CAA), 2017: 42:45)

[176] See: https://www.ft.dk/samling/20141/almdel/eru/bilag/237/index.htm
[177] Own translation of: *Vækst og udvikling i hele Danmark* (Danish Government, 2015)
[178] Own translation of: "Styrkelse af dansk luftfart til gavn for erhvervslivet."
[179] The following Danish ministries presented the Aviation Strategy for Denmark: Ministry of Transport, Building and Housing, Ministry of Foreign Affairs of Denmark, Ministry of Finance and Ministry of Industry, Business and Financial Affairs (Ministry of Transport Building and Housing et al., 2017)

Since around 2015[180], there has been a focus on the development of a new aviation strategy for Denmark, with input from different consultancy reports such as *Mappingand Benchmarking of the Aviation Sector*[181] (Copenhagen Economics & Qvartz, 2016) and *The socio-economic importance of Aviation for Denmark* (Copenhagen Economics, 2016).

Mapping and Benchmarking of the Aviation Sector (Copenhagen Economics & Qvartz, 2016) analyzes the Danish aviation sector. Initially the report comments on the socio-economic value of the Danish aviation by referring to a prior analysis from a previous industrial report: *Denmark as an Attractive Aviation Nation* estimating that the Danish aviation sector is contributing with up to DKK 100bn– where up to DKK 57bn are produced by catalytic effects (see also section: 2.4 – regading catalytic effects). Among other elements, the report analyzed the traffic composition in Denmark, and found that since 2005, Denmark has seen a growth in passengers of 3%, where most of this growth is provided by low cost airlines. Over the years, there has been a shift in the ratio between Danish airlines vs. foreign airlines; in 2005, Danish airlines provided 72% of all capacity while in 2015 the ratio was decreased to 42%. Further, the report focuses on connectivities based on the methodology of NetScan (see section: 5.3). Here it is pinpointed that the hub connectivity at Copenhagen Airport has dropped 25% between 2006 and 2016. Next, the analysis evaluates airlines criteria for choosing airports to operate from. Out of the ten criteria, the three most important criteria are Market size and demand, Route yield, and Competition. The forth criteria is Airport charges and discounts. As a comment in response to one of the analyses in the report, one of the airlines mentioned that "*lower charges will have the biggest impact on growth for us in CPH*" (Copenhagen Economics & Qvartz, 2016, p. 20). In addition, the report finds that Copenhagen Airport is performing well on all parameters. However, it illustrates that Copenhagen Airport are ranked 4 out of 11, with only other Scandinavian capital airports as cheaper. Finally, the report presents three main challenges for Danish Aviation (Copenhagen Economics & Qvartz, 2016, p. 27):

[180] See: https://www.check-in.dk/nu-faar-luftfarten-sin-strategi/

[181] Own translation of: *Kortlægning og benchmarking af luftfartssektoren* (Ministry of Transport Building and Housing et al., 2017, p. 3]. Please note this report is marked "*fortrolig*" or in English: "*confidential*" (Ministry of Transport Building and Housing et al., 2017, p. 154). However, it is made publicly available on the Danish parliament webpages as an attachment for a letter addressing the Danish Transport, Building and Housing Committee stating that the report is part of the analytical preparation for the *Aviation Strategy for Denmark*. See webpage: https://www.ft.dk/samling/20151/almdel/tru/bilag/394/index.htm
See letter: https://www.ft.dk/samling/20151/almdel/TRU/bilag/394/1668912.pdf.
See: Attachment: https://www.ft.dk/samling/20151/almdel/TRU/bilag/394/1668913.pdf (Copenhagen Economics & Qvartz, 2016)

Low cost airlines, since they are contributing less – compared to network airlines – to the connectivity due to lower frequencies and less connections to other airport hubs in order to provide indirect connectivity.

Pressure on Transfer traffic. It is highlighted that the Copenhagen Airport's hub position has been reduced since 2005, and this has weakened the relatively influence as position as hub for intercontinental connectivity.

Low or no profitability. It is highlighted, that the selected network airlines on average only have a profitability of 2%, while the selected low cost airlines have an average profitability of 8%, and therefore the direct connectivity and hub connectivity from Copenhagen Airport is challenged since 75% of airlines providing connectivity at the airport have consistent negative profitability. It indicates that the hub function at Copenhagen Airport is under pressure since the most network airlines has low profitability.

In addition, the report *Mapping and Benchmarking of the Aviation Sector*, the *Aviation Strategy for Denmark* also draws on the conclusion from *The Socio-economic Importance of Aviation for Denmark*[182] (Copenhagen Economics, 2016). This report provides an extensive analysis of the traffic composition and development of the aviation system in Denmark along with an estimation of the socio-economic effects from the overall aviation industry and an evaluation of the airline segments. Among other conclusions I will highlight that the report finds that new inter-continental destinations served by low cost airlines provide higher socio-economic gain per passenger due to lower ticket prices. However in contrast, network airlines do have higher frequencies, which provides an overall higher socio-economic gain; by this the report estimates that new long-haul destinations served by network airlines have a socio-economic value between DKK 50-100m per year, while long-haul destinations served by low cost airlines are worth between DKK 35-65m per year. Further European destinations served by network companies provide a socio-economic gain of DKK 15-50m per year, while low cost airlines only provide a gain of DKK 15-25m per year. Disregarding these potential future gains from serving new destinations, the report also finds that due to the market growth of low cost airlines, they have contributed to 67% of all new aviation jobs in the years 2005-2015. Furthermore, the report highlights that the aviation hub position for Copenhagen Airport provides significant value for Denmark and in the case where SAS would lower its hub activities in the airport by four long-haul destinations and the associated transfer traffic, it will have a negative socio-economic effect of DKK 3-5bn (Copenhagen Economics, 2016, pp. 4-5). This illustrates that even though low cost airlines have contributed with 67% of all new aviation jobs and new connectivities the last decades, SAS still plays a very significant role in providing connectivities and global coherence for the Danish society.

[182] Own translation of: "*Luftfartens samfundsøkonomiske betydning for Danmark*"

The *Aviation Strategy for Denmark* is produced with input – among other items – from *Mapping and Benchmarking of the Aviation Sector* that presents that Danish aviation is confronted with the competition from low cost airlines, a challenging situation for Copenhagen Airport as a hub and the low profitability for network airlines. Additionally, the report *The Socio-economic Importance of Aviation for Denmark,* which highlights that network airlines provide the most value by establishing new destinations, also provides analytic inputs to the *Aviation Strategy for Denmark*.

The *Aviation Strategy for Denmark*, 2017 initially states that the objective of the strategy is to establish more connectivity to and from Denmark to increase economic growth, employment and coherence between regions:

> *Objective of the Government's aviation strategy: With its new aviation strategy, the Government wishes to strengthen the basis for the establishment of more routes and more daily departures to and from Denmark and within Denmark. This will increase Denmark's national and international connectivity to the benefit of economic growth, employment and cohesion between regions. (Ministry of Transport Building and Housing et al., 2017, p. 3).*

This objective of the strategy is similar to the previous aviation strategies in Denmark, with a natural focus on improvement of connectivity. However I will argue that the articulations in the *Aviation Strategy for Denmark*, – and especially in the supporting documents – is much stronger in highlighting the societal effects of hub function in Copenhagen Airport and associated societal consequences if the hub function is deterioratering.

12.5.3.1 Aviation Strategy for Denmark vs. Previous Strategies

In this section, I will shortly elaborate on the development in the different aviation strategies in Denmark and argue that the strategies from the version in 2005 to the newest in 2017 have an increasing societal argumentation of the need for a political focus on the hub function in Copenhagen Airport and the connectivity in Denmark.

In the strategy document from 2005: *Danish Aviation 2015*, the consequence of not maintaining direct connections from Denmark are articulated in terms of, that it will become more time consuming and inconvenient for business environment and for tourists to travel to and from Denmark. Further, it is articulated that fewer foreign companies will locate their headquarters in Denmark, and there will be less foreign investments in Denmark (Transport- og Energiministeriet, 2005, p. 10). These articulations could be perceived as important, but they do represent wider societal consequences. It is shortly mentioned, that due to the bankruptcy of Sabena (the former network carrier in Belgium) 17.000 jobs were lost, the debt of state grew by EUR 830m and the hub function in Brussels Airport was nearly lost (Transport- og

Energiministeriet, 2005). However, the articulations of the importance and the consequences of losing a hub carrier or connectivity are not articulated as strongly as in the next aviation strategies.

In the *Report from Danish Aviation Committee*, 2012, the articulations of the importance of Danish aviation is presented at page 3 as it is articulated that the aviation industry in Denmark generates 45.000 jobs (Udvalget om Dansk Luftfart, 2012, p. 3). Further, it is stated that in case of SAS would stop operating as hub carrier 25% of the passengers at Copenhagen Airport would be lost. (Udvalget om Dansk Luftfart, 2012, p. 7). Further, the wider economic effects are shortly presented at page 25 and is estimate to be DKK 20bn, and the direct and indirect jobs are estimated to be 50.000 jobs (Udvalget om Dansk Luftfart, 2012, p. 25). However, first in the in last chapter of the report, the wider societal effects of the aviation sector is presented more toughly to provide DKK 20bn DKK in GDP due to direct and indirect effects (Udvalget om Dansk Luftfart, 2012, p. 107). Along this, the tourism spending is estimated to be DKK 20 bn. Further, in this last chapter, the potential loss of SAS as hub carrier is estimated to imply as loss of 25% of passengers due their hub activities (Udvalget om Dansk Luftfart, 2012, p. 107). In comparison to Danish Aviation 2015, there is an increase attention to the wider societal effect of aviation in Denmark, but I will argue that it is first in the latest publication: *Aviation Strategy for Denmark* that the challenges for Danish aviation is articulated as a *burning platform* due to the societal importance of aviation for Denmark.

In the current aviation strategy: *Aviation strategy for Denmark* the societal effects are presented very much upfront already in the 2nd chapter: where the direct and indirect effects are estimated to be DKK 30bn and the catalytically effects is estimated to be towards DKK 57bn (Copenhagen Economics & Qvartz, 2016, p. 22)[183]. In addition, the strategy publication is based on supporting documents – as presented above – where the societal effects are highlighted and there are a very clear articulation of the three main challenges for the Danish aviation sector: *Low cost airlines*, *Pressure on Transfer traffic* and *Low or no profitability*. By having this line of arguments, the societal importance of aviation and three challenges to address in order to maintain and develop the aviation sector, I will argue that this has increased the political attention and motivation to outline the initiatives in the new aviation strategy founded within the Danish Government. Based on this, I will in the paragraph below present some of the 38 initiatives to support the objectives of the newest aviation strategy for Denmark.

[183] In the supporting document: *Mapping and Benchmarking of the Aviation Sector* do also present the induced effects of DKK 13bn, but these are left out in the main strategy paper: *Aviation Strategy for Denmark* (Copenhagen Economics & Qvartz, 2016, p. 3] (Copenhagen Economics, 2016, p. 18]

This section illustrates that in the newest aviation strategy for Denmark is founded in an understanding of aviation in Denmark and particular the hub function in Copenhagen Airport is important for the Danish society.

12.5.3.2 Aviation Strategy for Denmark: Initiatives

To achieve the objectives in the Aviation Strategy for Denmark (see section: 12.5.3), the strategy articulates 38 initiative. Below I will elaborate on some of these.

The *Aviation Strategy for Denmark* list 38 initiatives that should support the development of Danish connectivities. By evaluating the 38 initiatives, as presented in Figure 38, I have grouped the initiatives in to categories that indicate the different focus points of each initiative. The different categories constitute elements such as Infrastructure in the Copenhagen Airport, Regulation of the Copenhagen Airport, Level playing field and Domestic traffic. Furthermore, based on the articulations in the *Aviation Strategy for Denmark* shows different levels of engagement by the stakeholder, which in most cases is the Government, such as "*Support*", "*Investigate*" or "*Will make adjustment*". These illustrate the different approaches the Government will take towards each initiative. These initiatives labeled "*Will make adjustment*" are concerning Regulation of Copenhagen Airports A/S. I will next elaborate on these initiatives – starting with the regulatory changes for Copenhagen Airport.

Initiative	By who	Purpose	Level of engagement	Category (own adoption)
1	Gov't and CPH	Expansion of CPH trainstation	Investigate	Infrastructure in CPH
2	Gov't	CPH expansion plans	Support	Infrastructure in CPH
3	Gov't	Solution related to crosswind runway	Encourage	Infrastructure in CPH
4	Gov't	Relax of requirement of activities needs to be aeronautical	Work for	Infrastructure in CPH
5	Gov't	Change other restrictions on development of airport	Investigate	Infrastructure in CPH
6	Gov't (and Swedish Auth.)	Efficient airspace	Work for	Airspace
7	Gov't	Equal and transparent regulation model of CPH	Work for	Regulation of CPH
8	Gov't	Increase commercial x-sub in regulation model	Will make adjustment	Regulation of CPH
9	Gov't	Reduce Transfer charge	Will make adjustment	Regulation of CPH
10	Gov't	Reduce domestic charge	Encourage	Regulation of CPH
11	Gov't	Set new KPIs for security control	Will make adjustment	Regulation of CPH
12	CAA	Introduce new sanction systems in relation to KPI	Will make adjustment	Regulation of CPH
13	CPH and CAA	New KPIs for baggage and pasport control	Investigate	Regulation of CPH
14	Gov't	Regional airports: Potential relaxations of security regulation	Work for	Regional airports
15	Gov't	Better cooperation between Danish and Int'l authorites	Work for	Level playing field
16	Gov't	Lower EU security regulation requirements	Work for	Level playing field
17	CAA	Improve cooperation between regional airport and authorities	Will make adjustment	Regional airports
18	CAA and Tax Authorities	Improve supervision	Work for	Cooperation between Authorities
19	ATC	Unmanned air traffic control towers at Regional airports	Investigate	Regional airports
20	Gov't	Decision on taking responsibility for the aviation sector	Work for	Faroe Islands
21	Gov't	Faroe Islands' wish to accede to the ECAA Agreement	Work for	Faroe Islands
22	Gov't	Stronger cooperation between Danish authorities	Will secure	Route development
23	Gov't	Financial support to Global Connect	Work for	Route development
24	Gov't	Financial support to Vestdanmark	Investigate	Route development
25	Gov't	Making new aviation agreements	Work for	Air service agreements
26	Gov't	Debate aviation agreements when Ministers visit relevant countries	Ensure	Air service agreements
27	Gov't	Liberalization of existing aviation agreements	Will focus	Air service agreements
28	CAA	Denmark to accede to Global Entry.	Investigate	Access to US
29	Gov't	Joint aviation agreements regarding labour market	Work for	Level playing field
30	Gov't	Limit disloyal forms of practice in third countries and of operators in third countries	Support	Level playing field
31	Gov't	Clear and transparent rules at EU level so companies do not exploit differences in the laws	Work for	Level playing field
32	Gov't	Uniform guidelines within the EU for the supervision of health and safety onboard aircraft	Work for	Level playing field
33	CAA	Streamline the safety contribution	Work for	Level playing field
34	ATC	Reducing the "en route charge" and the "TNC charge"	Work for	Level playing field
35	Gov't	Domestic air traffic should be included in rejseplanen.dk	Support	Domestic traffic
36	Gov't	Copenhagen Airport to focus on ensuring capacity for domestic air traffic	Encourage	Domestic traffic
37	Gov't	Copenhagen Airport to focus on ensuring capacity for domestic air traffic	Encourage	Regulation of CPH
38	Gov't	Copenhagen Airport to focus new capacity for domestic air traffic in future investments plans	Encourage	Regulation of CPH

Figure 38: The Aviation Strategy for Denmark, 2017 has an objective to "strengthen the basis for the establishment of more routes and more daily departures to and from Denmark and within Denmark" (Ministry of Transport Building and Housing et al., 2017, p. 3). This objective is supported by 38 initiatives as presented above. The Categories are the author's own analysis of the focal points of each initiative. Level of engagement is based on wording in Aviation Strategy for Denmark. Own creation based on (Ministry of Transport Building and Housing et al., 2017, p. 149-153).

The same day as the publication *Aviation Strategy for Denmark* was published (3 July 2017); a draft was also published for a new regulatory model (BL 9-15)[184] for Copenhagen Airport in line with the regulatory initiatives from the strategy. The draft for the regulatory model was the baseline for a consultation process among stakeholders (Transport- Bygnings- og Boligministeriet, 2017b).

After the consultation process, the final adjusted regulation model was published 16 November 2017: BL 9-15 Edition 4 (Danish CAA, 2017), which will apply for the next charge negotiations for settling charges in Copenhagen Airport from April 2019. The new regulatory framework consists of several adjustments in relation to the prior editions - see footnote for overall explanation of the regulatory model[185]

In line with initiative 8; the BL 9-15 regulation model states that in case of a fallback situation, the commercial cross-subsidy is settled at 35% towards 2022 and from then on 40% (§8.4.4 and §17.5.10). This is a significant change since prior regulatory frameworks provided more motivation to develop a negotiation process between the parties by proposing a commercial cross subsidy range between 10% and 50% in case of fallback (Danish CAA, 2008; Danish CAA, 2011; Danish CAA, 2013).

In relation to initiative 9: "*In the public interest, the Government will introduce a reduction in the ratio between the charge per transfer passenger and the charge per locally departing passenger in the regulatory model. This is to contribute to retaining the important gains from the additional connectivity that the hub will ensure Denmark."* (Ministry of Transport Building and Housing et al., 2017, p. 84). This is implemented in §8.5 in the newest BL 9-15, which states that in case of a fallback situation, the Danish CAA, will settle a maximum ratio for transfer passenger charge in relation to local departing passengers charge.

The societal argumentation for a focus on transfer charges is also articulated in a more general approach, as §3.6 states that: "*The airport charges may be modulated in the interest of the public and the community*".

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[184] The regulation model for Copenhagen Airport is articulated in BL 9-15 (Danish CAA, 2017). The overall principles are based on voluntary charge agreements between airlines and Copenhagen Airport. In such a case where it is not possible to settle a negotiated agreement, a fallback principle will apply in order to determine overall charge level. Fallback model is based on an initial information package provided by the airport with input from airlines. The fallback is based on a cost recovery principle with a given level of commercial cross-subsidy. Since this fallback will apply in case of no agreement, it will provide a reference point for a negotiated agreement.

[185] The prior regulation framework in 2007 Danish CAA published the first edition of BL 9-15; the newest BL 9-15 is the fourth edition. These BL 9-15 have been the foundation for three negotiated charge agreements between airlines and Copenhagen Airports A/S: October 2009: a 5 ½ years agreement, October 2010: Modification of charge agreement as a consequence of the construction of the GO facility in Copenhagen Airport and April 2015: 4 years agreement.

The potential fallback situation creates a reference point for the voluntary agreement between the airlines and airport. The fallback model depends on several input variables. With the newest BL 9-15 some elements are now predetermined. Along the relative level for passenger transfer charges, the WACC and the passengers forecast (§6.4) is now settled by the regulator, and this will potential limit the room of the negotiations between the parties.

Besides these elements related to commercial cross subsidy, transfer charges, WACC and passengers forecast, the regulatory framework is also adjusted in other ways, but due to the scope of this thesis I will not elaborate further on these. On the one hand, the overall adjustments of the regulatory framework for Copenhagen Airport will could lower the charge level, since the commercial cross subsidy will be raised from approximately 0% to 35% for the next charge period[186]. The final financial consequences are yet to be identified, since the charge level and structure is part of the negotiation taken place just as the thesis is written. However, Copenhagen Airports A/S estimates that it will have a significant negative impact on the airport's finances in the next regulatory period from 2019: "*regulations will have a significant impact on the airport's finances*" (Copenhagen Airport, 2018, p. 13). On the other hand there could be an increase in the passenger demand for travel due to lower ticket prices and this will eventually increase the profitability for airlines operating a given route (Ministry of Transport Building and Housing et al., 2017, p. 79).

The 38 initiatives presented in the *Aviation Strategy for Denmark* has, as stated earlier, different focal points. In order to support the development of the infrastructure at Copenhagen Airport, the Government will work for some adjustment and relaxations in the spatial planning policies (see initiative 4 and 5 in Figure 38). This could ease the airport's possibilities to further increase capacity and develop the airport in line with the airport's expansion strategy: *Expanding CPH* (see section: 12.3 History of Copenhagen Airport). The *Aviation Strategy for Denmark* is still relatively new, so the implementation or the focus on different initiatives – beside the new regulatory framework for Copenhagen Airports A/S – is yet to be seen. The overall assessment of the strategy to enhance the connectivity of Danish aviation indicates that the 38 initiatives largely are trying to address the challenges presented in the report *Mapping and Benchmarking of the Aviation Sector:* The pressure from low cost airlines, the

[186] According to *Aviation Strategy for Denmark*, the commercial cross subsidy was approximately 0% in 2015 and 2016, therefore - all things being equal - an increase in commercial cross subsidy will lower the revenue frame (Ministry of Transport Building and Housing et al., 2017, p. 78]. The actual development of charge level into the next regulatory period starting April 2019, will also be influenced by the fact that Copenhagen Airport A/S decided to lower the charge level by 10% in April 2018 and introduce a new hub incentive model as part of "*CPH's focus on constructive dialogue and the effort to find solutions*" (Copenhagen Airport, 2018, p. 13]

pressure on transfer traffic at Copenhagen Airport, as well as low or no profitability at network airlines. Along different elements of spatial planning to address various forms of capacity challenges at airports and airspace including an improvement of dialog between stakeholders.

In contrast to the prior aviation strategies, this *Aviation Strategy for Denmark* was produced and presented by the Danish Government. This generates a certain leverage towards being able to get the initiatives implemented. As Director, TBST (Danish CAA) states:

> "*When the government presents a strategy. … it's an acknowledgement or expression of how it's reached the top of the political agenda: Danish aviation. That is, not just safety, which has typically been our [Danish CAA] take on it, historically. But having that business take and the societal take, that's something I'm working on here.*" (Director, TBST (Danish CAA), 2017: 35:50)

However, an interesting perspective is that the strategy was not directly initiated by politicians but there was recognition and some pressure from business organizations and stakeholders that generated an open window for formulating the strategy, as Director, TBST (Danish CAA) states:

> *"Sometimes there's this open window where things just suddenly happen, … I really think there's some recognition, some pressure from, I mean, from business organisations and various interested parties, more than it is something that was just invented by regulators and politicians on boards and in departments. I think more that there are some things that converge like that" (TBST (Danish CAA), 2017: 33:43)*

As shown above, some of the initiatives focus on adjustment of the regulatory framework for Copenhagen Airports, this is also articulated by Director, TBST (Danish CAA), that stresses that the cost level airlines are facing in the airport, have had negative consequence for development of connectivities, as he states:

> *"We've heard from several places that it's expensive to operate at the Copenhagen Airport, and that it seemed like it would hold back development. It may well be that it's been good for shareholders, but it's not good for society. Not good, in the sense that we miss out on some routes, so we miss out on some accessibility that we otherwise would have had if it had been more attractive to operate at the Copenhagen Airport." (Director, TBST (Danish CAA), 2017: 33:09)*

The overall purpose with the aviation strategy is well received by the CEO of Copenhagen Airports A/S. He articulates that the national strategy is a good idea, since there historically has been low political attention towards aviation – as argued above. However, the CEO of Copenhagen Airports A/S articulates that the strategy is too narrow with a main focus on regulation. If the focus is growth, the strategy should have a wider perspective on tourism, business and supportive infrastructure, as he states:

> *"Aviation has been very low-priority from the political side, and I think that's a mistake. That's why I thought it was such a good idea, and why we were encouraging an aviation strategy. The aviation strategy is, in my opinion, something entirely different from what is in the foreword. Because it said growth, and accessible, and jobs. I can sign off on that, sure. However, in reality 90% of the strategy is really about regulating the Copenhagen Airport. And that's not an aviation strategy; that's a policy and regulatory measure. It has nothing to do with aviation strategy. It's obviously just a convenient title. But the underlying regulations show very clearly that it has nothing to do with that. The aviation strategy is fine enough if you read that document, but the underlying regulations, those are entirely about increased regulations for the Copenhagen Airport." (CEO, Copenhagen Airport, 2017: 26:55)*

The wider perspective on aviation relates to an understanding of a hub airport as more than just the airport as a hub function for an airline's business model; as the CEO of Copenhagen Airport articulates this in relation to the development of a hub: *"When we talk about the hub, it's not just a matter of the aviation hub. It's just as much a matter of being a hub for the whole region, in the form of trains, the metro, highways, and so on; it's a focal point not just for aviation, but for several elements such as hotels, conferences, and so on. That has to be the focal point to be able to drive economic growth." (CEO, Copenhagen Airport, 2017: 28:51).*

This understanding of a hub airport articulated by the CEO of Copenhagen Airport as a nexus of ground and air traffic flows at the airport enabling different forms for business activities, is different from the perception and understanding of a hub solely as an airline business model as presented in the different aviation strategy papers and among my interviewed persons. On one hand, the advantages of such wider focus and understanding of the hub could generate an additional benefits for the society, but it would require involvement of several other actors, both regional and national, in order to generate a foundation for development of urban areas and business. On the other hand, an additional wider understanding a hub airport could remove some political focus on the airlines business models supporting the aviation hub.

As illustrated here, and previously in this section by the reviews of the different aviation strategies in Denmark, the one from 2005 to the newest one in 2017, illustrates that there has been a development in the political attention towards aviation and the aviation hub. From a passive political attention, where the main focus was on regulation of safety in order for the aircrafts not to fall from the sky, to an understanding of the link between the growth in Danish society and the development of aviation. However, as stated lastly in this section there can also be different perceptions of what an hub airport is - either a hub for airline business models or as a wider nexus of transport modes and mobilities at the airport in order to enabling different forms of business developments. The implications and effects of the newest aviation strategy are still to be seen, however it illustrates that the political attention towards aviation has increased due to involvement of the Danish Government.

In the next section I will shortly elaborated in the corporate strategies of Copenhagen Airport.

12.5.4 COPENHAGEN AIRPORT'S STRATEGIES

Copenhagen Airports A/S have had several strategies since 2010 and due to the nature of the airport business, the strategies are based on two segments which depend on each other – one focuses on the commercial segment and one focuses on development of the aviation segment. Below I will elaborate shortly regarding the strategies.

In 2007-09, the corporate strategies were focusing on passengers' satisfaction, airlines' total cost of operation in the airport and a long-term growth target of 30 million passengers by 2015. The mission statement was articulated as: "*We connect passengers and airlines - and bring Scandinavia and the world together*[187]*"* and the corporate vision was: *"We will be the world's best airport for passengers and airlines*" (Copenhagen Airport, 2009, p. 9). The strategy elaborates that this can only takes place in cooperation with airlines, employees, government, ministries, municipalities and organizations (Copenhagen Airport, 2009, p. 9).

In 2010, the strategy focusing on development of aviation was labeled: *Dual Airport*, where the aviation strategy had an explicit focus on both the development of network carriers and on low cost airlines (Copenhagen Airport, 2011, p. 10). This had also been the focus prior, but for the first time the two different business models were both articulated in the aviation strategy. In 2009, Copenhagen Airport made a strategic partnership with SAS where one of the focus points was to develop the transfer

[187] Own translation of: Mission statement: "*Vi forbinder passagerer og flyselskaber – og bringer Skandinavien og verden sammen*" and Vision statement: "*Vi vil være verdens bedste lufthavn for passagerer og flyselskaber*" (Copenhagen Airport, 2009, p. 9].

process; along this line, the airport also made a strategic partnership with Norwegian, where one of the first initiatives was to consolidate Norwegians traffic on Pier A in order for them to improve their transfer process. The strategic focus on low cost airlines can be illustrated by the inaugurations of the GO facility that supports fast turnaround times and where the charge level is lower compared to other facilities (Copenhagen Airport, 2011, p. 10).

From 2011-15, Copenhagen Airport articulated a new 5-year strategy: *World Class Hub*, with three focus areas: Extraordinary customer experience, Effective operation and Competitiveness (Copenhagen Airport, 2012; Copenhagen Airport, 2016) [p. 14) [p. 19). As elaborated before, as part of the *World Class Hub* strategy, Copenhagen Airport articulated the expansion plan: *Expanding CPH* towards 40 million passengers (Copenhagen Airport, 2014a, p. 5).

In 2016, the *World Class Hub* strategy was updated to: *World Class Hub 2.0*, in order to continue to be an attractive and competitive airport with continued focus on Effectiveness, Capacity, Extraordinary customer experience and Competitiveness. Along this line, there is a focus on improvement of employees' competencies, cooperation with business partners, authorities and other stakeholders and an exploration of digitalization. Furthermore, there have been initiatives to improve the domestic air traffic to secure international connectivity in order to improve the hub function and the coherence in Denmark. The vision of this strategy is articulated as: "*the Gateway to Northern Europe, where YOU come to visit and WE make you want to stay"* (Copenhagen Airport, 2018, p. 6, 24).

In addition to the corporate strategies from Copenhagen Airports A/S articulated in the annual reports; between 2010 and 2013, Copenhagen Airports A/S published yearly non-financial CSR reports: *CPH and Society*. The annual reports from 2014 also included some of these non-financial elements. The reports *CPH and Society* focus on the responsibility of Copenhagen Airport as a traffic hub and its responsibility as a corporation[188].

Based on this short elaboration of the different CPH strategies, which have highlighted that the airport have had several aviation strategies, with a focus on both low cost airlines as well as networks airlines. However in relation to the statements presented by CEO of Copenhagen Airport, regarding his role that have become more political and his view on a hub airport as a wider nexus of transport systems, this illustrates a growing outward societal perspective on the airport's role in society. This is also represented by a new initiative by the airport: "*Dear Neighbor*"[189] which is a communication platform, where the airport among other things promote dialog

[188] Based on review of the four reports: *CPH and Society* from 2010 to 2013 found on: https://www.cph.dk/om-cph/investorer/publikationer

[189] Own translation of: "*Kære Nabo*" See: https://www.cph.dk/om-cph/kaere-nabo (only in Danish). The web page was published in 2018.

between the local residents and inform about new facility constructions. The platform can be seen as a way to actively be involved in the local communities due to future construction plans that could generate some externalities, but also in a way to broaden the understand of the airport as hub for a nexus of different forms for mobilities.

It can be difficult to evaluate certain developments regarding the public Danish strategies towards aviation. However, I will based on this section argue that the public policies towards aviation in the early 80s was driven by a spatial focus on how the airport should develop as infrastructure, as well as a how the local area should develop in order to prevent potential future noise-related conflicts between local residents and the aviation sector. Based on the number of neighbor complains, this active policy seems to have paid off.

By evaluation the last three public aviation policies, I will argue that the politics have developed. From an understanding of the hub airport as passive infrastructure provider, to more active understanding where aviation – including the airport – is understood as a strategic tool that help facilitating different societal challenges - in this case domestic coherence and growth as stated in the governmental strategy: *Growth and development in the entire country of Denmark*. Based on this short elaboration on Copenhagen Airports A/S corporate strategies from 2009 and the CSR reports from 2010-2013, I will argue that there has been a logical awareness of the airport's aviation activities focusing on both low cost airlines as well as network airlines. Further, there are a focus on the dependency of a wider stakeholder group spanning from local to national politics and different other stakeholder groups. In relation to the publication of the *Aviation Strategy for Denmark*, Copenhagen Airports state in their annual report from 2017: "*We are pleased that the increased political focus on the importance of aviation is now a reality*" (Copenhagen Airport, 2018, p. 6). This increase in political attention and acknowledgement of the strategical importance of aviation as an imbedded part of society have to some extent developed the role of the CEO of Copenhagen Airports A/S as he states: *"My role has become more political."* (CEO, Copenhagen Airport, 2017: 04:22). In addition to this, it is also important to highlight that there are different articulations regarding the understanding of a hub airport. In the public aviation strategies the focus in on development of hub airport as part of an airline business model, while CEO of Copenhagen Airport articulates a hub airport in a wider context based on nexus of different mobilities.

12.6 THE MATERIALITIES DIMENSION

After I have elaborated on the development in different aviation policies in Denmark, and argue for a change in the political attention towards a more strategic acceptance of aviation in Denmark, I will in this section, unfold the different materialities that have influence on the production of aeromobilities in Denmark.

In this section, I will first shortly address the geographical location of the airport based on previously paragraphs, and secondly I will focus on SAS as the main hub carrier in Copenhagen Airport.

12.6.1 GEOGRAPHICAL POSITION

Amager, Oresund Bridge and the location in the southern part of Scandinavia
As stated in the section 12.3 History of Copenhagen Airport, the airport is located on the island of Amager less than 10 km from city of Copenhagen. The airport has a layout of its two main runways pointing towards the north-east and south-west (04L/22R and 04R/22L), the less used third runway has a direction north-west and south-east (12/30). The two main runways are directed towards the southern part of Amager and distributing traffic towards Køge Bay, and towards the north, traffic is distributed towards Oresund. Runway 12/30 is directed towards the western part of Amager and the city of Copenhagen, which includes larger housing areas and towards Øresunds as well. According to the Copenhagen annual report 2017, runway (12/30) was for takeoff in use less than 0.2%, however for landing, the runway – approaching from the sea – was in use 3.9% (Copenhagen Airport, 2018, p. 57). The two main runways were used for the residual traffic. This distribution of traffic on the two main runways limits the noise exposure towards major housing areas. Therefore the noise externalities generated from Copenhagen Airport is significant less compared to the situation especially in Brussels, where the main runways are pointing towards the capital city – as illustrated previously in section: 12.5 The Policies Dimension.

In 2000 the Oresund Bridge connecting Denmark and Sweden was inaugurate, the bridge and its associated tunnel begins just next to Copenhagen airport. Along the construction of the connection between the two countries, there was constructed highways and railways including a train station at the airport. This has increased the ease of getting to and from the airport both from different parts of Denmark but also from Sweden and by this, the possible catchment of the airport has increased in terms of how many people within a given transport time that can reach the airport. An interesting perspective is that the connection to Sweden was not constructed as a part of an aviation strategy, but as a way to support and develop Copenhagen city in a wider sense by bringing the southern part of Sweden closer to the capital and therefore develop the synergies between the two countries. Director, TBST (Danish CAA) states:

> *"As I remember, when it was decided, it wasn't for the sake of the Copenhagen Airport. It was because Copenhagen was in a very poor economic situation, back in the 70s and 80s, when we had decisions about Ørestad, about the Øresund Bridge and so on. We made that decision to get Copenhagen going. And building the Øresund Bridge wasn't because of aviation. Having the airport and aviation connected to motorways, to the metro, the bridge to Sweden, those are side benefits. But it wasn't for the airport's sake. It wasn't part of an aviation strategy" (Director, TBST (Danish CAA), 2017: 24:03)*

The development of ground transport infrastructure in the start of the century (also including the metro line as stated in section 12.3) has improved the ease of getting to and from the airport. Even though it was not directly thought in line with a wider aviation strategy, I will argue that it has generated an advantage for the airport and along the spatial planning approach in the beginning of the 80s. Based on this I will argue that – especially in contrast to Schiphol Airport, Zurich Airport and Brussels Airport – it generates a sound foundation for the airport further to develop.

In addition to this local geographical location of the Copenhagen Airport, it is also important to understand the airports position in relation to Scandinavia. The airport is located in the southern part of Scandinavia, and due to this location, the airport has a natural position in acting as a hub airport between Scandinavia and Europe. As I will elaborate on, this has been - and is still to some extent – a part of the business model for SAS to connect Scandinavian airports via Copenhagen to the rest of Europe, even though this has changed slightly since the liberalization of the aviation sector in Europe.

In the next section, I will elaborate on the main hub carrier, SAS in Copenhagen Airport and how its business model has developed over the years – especially with a focus on Copenhagen Airport with its location in the southern part of Scandinavia.

12.6.2 SAS

> *"SAS has been a stroke of genius in and of itself. It's been a good decision, a sound decision, that's helped to give all three Scandinavian countries more air traffic than they might have otherwise had." (CEO, Copenhagen Airport, 2017: 05:23)*

Scandinavian Airlines System (SAS) was founded just after WWII in 1946 as a constellation between the Danish airline: Det Danske Luftfartselskab A/S (DDL), Det Norske Luftfartselskap A/S (DNL) and Svensk Interkontinetal Lufttrafik AB (SILA) (SAS, 2018). SAS had a divided ownership between the Danish, Norwegian and Swedish governments. There have been different ownership structures over the years with three individual shares on the Danish, Norwegian and Swedish stock exchanges. First in 2001, a consolidation of all SAS shares toke place into the SAS AB, which is listed on the stock exchange in Copenhagen, Stockholm and Oslo. At year-end 2001, the Danish state held 14.5%, the Swedish state held 21.8%, the Norwegian state held 14.5% and privately owned shares: 50% (SAS, 2003, p. 26). The principle for the owner structure was based on 1:2:1 split between the three Scandinavian governments. Over the years, the governments have several times considered their ownership of SAS AB. Below is listed some statements that articulates the different positions.

In 2006, the Norwegian government did consider to buy all the Danish and Swedish shares, if the governments decided to sell (Andresen, 2006). In September 2008, according to a press release from SAS Group: "*SAS confirms that it is in the process of evaluating various structural possibilities for the Group*" (SAS Group, 2008). The press release was not very specific, but it illustrates that SAS was considering different setup that could influence the structure of the company. After several years of debating this ownership-structure of SAS, the Swedish Minister for Enterprise and Innovation stated in summer 2016 that federal ownership is not considered to be the best long-term solution for SAS:

> "*The whole European airline industry is under a lot of pressure and the market is not saturated in terms of consolidation. SAS needs to work in the long term with its strategic choices and in view of that I don't think a federal ownership is the best" (Mikael Damberg, Sweden's Minister for Enterprise and Innovation, 2016)* [190]

Consequently, the Norwegian and Swedish states agreed to reduce their ownership by 19 million shares October 2016 (Government Offices of Sweden, 2016). Latest in 2017, SAS AB issued new shares for DKK 138m, and the Danish government did purchase a part of the new shares in order to maintain its relative ownership of 14.2%.

[190] See: http://nordic.businessinsider.com/the-dream-of-an-international-hub-in-the-nordics-is-alive---the-scandinavian-governments-want-to-sell-sas-2016-7/

The other three main shareholders: the Norwegian, Swedish and Knut and Alice Wallenbergs Fond did not increase their share. Consequently, these shareholders did decrease their ownership of SAS AB (Ministry of Finance, 2017).

In Figure 39, the ownership structure of SAS is illustrated:

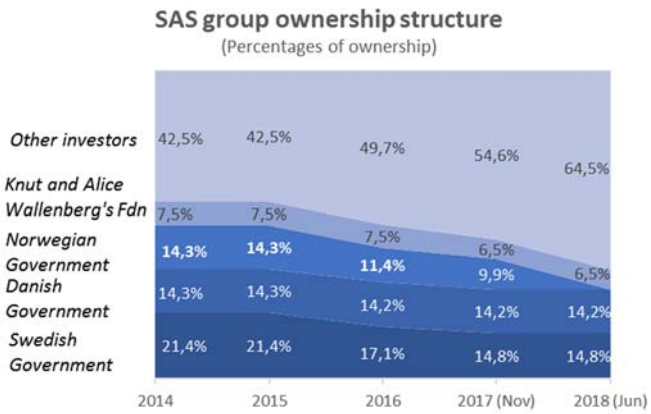

Figure 39: SAS group ownership structure. The governments of Sweden and Norway including Knut and Alice Wallenberg's foundation have decreased their ownership throughout 2016 and 2017 (SAS, 2015; SAS, 2016; SAS, 2017; SAS Group, 2018)

The development in SAS group ownership structure is measured in percentages of voting rights. In 2017, the redistribution was a consequence of a process with new shares being issues and the governments of Sweden and Norway including Knut and Alice Wallenberg's foundation did not buy any of the new shares. The Danish government on the other hand did buy relatively enough to maintain their share of voting rights. For the first time, "Other investors" had more than 50% of the voting rights – see *Figure 39*. Finally, in summer of 2018, the Norwegian government sold its entire holding of SAS shares, which makes the Danish Government, the Swedish Government and Knut and Alice Wallenberg foundation the largest shareholders with a total share holding of 35.5%. How this redistribution of ownership structure influences the development of SAS, is still unknown. It can be questioned whether the new owner structure at all have influenced SAS airline, since as COO at SAS states in relation to route planning: "*National interests, and so on, those don't play a part in our route planning any more. They don't" (COO, SAS 2017: 30:07)*. But, there is a convergence between national interests and how SAS distributes its capacity since, as COO at SAS continues: *"So we fly to places that are of interest to Denmark. Why? Well, because that's where our customers want to go. That's where businesspeople want to go, that's where politicians want to go, that's where everybody wants to go. And so, the reality is that there are such great parallels between national interests and what's really in SAS's interests." (COO, SAS 2017: 30:51)*

During the last decades, there has been a significant consolidation of European airlines (Burghouwt & de Wit, 2015, p. 110), in line with this, there has been consideration whether SAS would be consolidated with other airlines. Whether it should be e.g. one of the major European airlines such as Lufthansa, IAG group or one of the Middle East carriers has not been realized. Back 2008 a Lufthansa acquisition of SAS was imminent, but due to the bankruptcy of the Lehman Brothers investment bank and the associated financial crisis, the plans were cancelled. Even though these plans was abandoned, the former chairman of the board at SAS: Mr. Schur have articulated that he thought it would be beneficial for SAS to be part of some kind of merger (Buchhave, 2012). Whether these strategic considerations still are valid is for me unknown, but it illustrates at least that a potential merger have been part of the strategical development.

Strategies over time

SAS has had several strategies over the years, as a natural response to the industrial development. Based on an evaluation of several annual reports since 1992, I will highlight some trends in the company's development. I will argue that there has been shifts in their strategy, from using Copenhagen Airport as hub for some traffic flows between Scandinavia and Europe, to having more direct flights between these two regions. This development is due to the increased competition SAS has been facing since the liberalization of the aviation industry in Europe. Despite this decrease in transfer traffic between Scandinavia and Europe, the transfer traffic for long-haul traffic have increased supporting SAS's long-haul routes out of Copenhagen Airport. However, the increased transfer traffic between Europe and long haul destinations, has not been sufficient to counterbalance the decreased in European-European transfer traffic, which is why there has been a long trend of decline in transfer traffic.

Back in 1992, Copenhagen Airport was articulated as the "*heart of SAS's intercontinental network*" (SAS, 1993, p. 11). This was shortly after the collapse of the Soviet Union in 1991. Consequently, SAS did expanded its perception of its home market to include the Baltic countries – and therefore to use Copenhagen Airport as a hub for Baltic traffic (SAS, 1993, p. 11). Due to the liberalization of the European aviation market in the mid-90s the competitive situation increased, as SAS states in their annual report 1996; within their home market in Scandinavia, SAS is facing 8 new competitors (SAS, 1997, p. 11). This competitive situation increased over the years. In order to stay competitive, SAS was forced to increase their utilization of aircrafts by increasing the focus on point-to-point traffic and the associated faster turnaround time and simpler handling in relation to network traffic (SAS, 2002, p. 27). This trend was also articulated in the 2002 annual report from SAS. In order to defend the position in the market, the company will continue to provide non-stop flights between Scandinavia and the larger European business destinations. In order to serve less attractive business destinations, the traffic will be distributed via hubs. This trend with a focus on direct flights did also apply to the leisure traffic. In addition, the long-haul traffic were also to be based on direct flights from Scandinavia (SAS,

2003, p. 40). Even though long-haul flights from different parts of Scandinavia was articulated, the majority of SAS long-haul flights are still operating from Copenhagen Airport. From 2008 to 2017, Copenhagen Airport has had on average 70% of all SAS long-haul traffic, while in SAS' two other hubs[191]: Stockholm airport (Arlanda) has had 24% and Oslo Airport 7% (SRS seat data). There has been yearly fluctuations both in overall long-haul capacity provided by SAS, and in yearly distribution between the three main Scandinavian airports. In 2017, Copenhagen Airport only had 60%[192] of the long haul traffic; while Stockholm airport (Arlanda) had 29% and Oslo 11% (SRS seat data).

The trend with more focus on direct flights due to the liberalization, did naturally challenge the hub development in Copenhagen Airport, especially from the 2000-2010, where the transfer passenger decreased by 3.9 million transfer passengers – or 44%. Since then from 2010 to 2017, there has been a level of transfer passengers around 6 million transfer passengers per year (As previously stated in e.g. section: 12.4 Copenhagen Connectivity). SAS provides just below 80% of the transfer traffic in Copenhagen Airport (MIDT data)[193]. Therefore, the development of SAS is linked to the level of transfer traffic. Since 2008 to 2017, SAS have decreased its capacity with 5% - as stated in 12.4 Copenhagen Connectivity.

[191] According to Annual report November 2016–October 2017: SAS has 3 main operational hubs, see page 67 in annual report. https://www.sasgroup.net/en/wp-content/uploads/sites/2/2018/01/2017eng.pdf

[192] The distribution of long haul traffic departing from Copenhagen Airport, Arlanda and Oslo Airport is as 2017. This distribution will changed since SAS decide to reallocated long haul flight from Arlanda to Copenhagen Airport from Winter 2018. See: https://www.sasgroup.net/en/sas-opens-new-route-from-copenhagen-to-hong-kong/ Located September 17, 2018

[193] Based on the years 2010-2016

As illustrated in the table below, SAS's transfer flows in Copenhagen Airport is predominately between Europe and Scandinavia. However, from 2010 to 2017, there has been a downward trend in the transfer traffic between Europe and Europe, while the European - long-haul transfer has an upward trend.

SAS development in transfer splits in Copenhagen Airport (one-stop)	2010	2011	2012	2013	2014	2015	2016	2017
Transfer between Europe and Europe	81%	81%	83%	81%	78%	79%	78%	71%
Transfer between Europe and long-haul destinations	19%	19%	17%	19%	22%	21%	22%	29%

Table 18: At Copenhagen Airport, the distribution of transfer passengers traveling between Europe and Europe together with the transfer passengers traveling Europe to long-haul destinations are changing. From 2010 to 2017 the share of SAS transfer traffic between Europe and Europe at Copenhagen Airport have had a downward trend from 81% to 71% (with a large decrease in 2017), while there have been an increased in transfer between Europe and long haul destinations from 19% to 29%. Please note this only applies to SAS transfer traffic with one-stop traffic, however this constitutes 85% (2017) of all SAS transfer flows in Copenhagen Airport (MIDT data).

Along the redistribution of traffic – especially from 2000 to 2010 – SAS has over the years, to become more competitive conducted a significant reconfiguration of their entire organization, aircraft production and business models. In order to operate in a competitive environment SAS needs to have attractive prices and products. Consequently, SAS has by several cost reduction programs lowering their Unit Cost from 2008 to 2017 by more than 28% (SAS, 2017, p. 106). This cost reduction came after some challenging years in 2008 and 2009, where the unit cost had increased due to global financial crises after long-term progress in cost saving since 2000 (SAS, 2010, p. 46). Due to these reconfiguration initiatives, SAS have managed to have a positive financial result from 2015 to 2017 after solely negative results since 2008 (SAS, 2017, p. 107).

SAS has and is still facing competition and therefore it is natural for them to allocate traffic flows to where it gives most economic sense in response to competition. This is very much in line with what COO from SAS elaborated on previously in this section. The traffic distribution – along the level of transfer traffic in Copenhagen Airport – is not based on a given national interests, even though there can be convergence. The challenge with the declining – or as from 2010 a steady – transfer trend in Copenhagen Airport could therefore be challenged further if the market for direct traffic between Europe to Scandinavia increases. As stated in section 12.4 Copenhagen Connectivity, 69% percent of the transfer traffic in 2017 consists of transfer passengers between Europe and Scandinavia and only 31% of transfer traffic between Europe and long-haul destinations. Therefore it could be a future challenge to counterbalance a potential decline in transfer traffic between Scandinavia and

Europe if the downwards trend continues. Such a development, where the transfer flows in Copenhagen Airport between Scandinavian and Europe declines, will eventually lower the supply of airline capacity and by this, potentially lower the supply of capacity to support of long haul traffic – and therefore challenge the long-haul traffic development from Copenhagen Airport. This trend can to some extent proactively be countered by reducing transfer capacity outside the peak of supply for long-haul destinations; however, it could still challenge the long haul supply, if there is a significant reduction feeder route capacity.

Whether the new economic regulation model for Copenhagen Airport, as addressed in section 12.5.3, with a focus on transfer charges (among other elements) including a hub incentive model (see footnote: 186), will change the development in transfer traffic must rely on alternative traffic flow opportunities. All things being equal, it could provide an economic incentive to increase the transfer flows at Copenhagen Airport, but the effects are still unknown. In addition to this, it is unknown how a potential new owner structure could influence SAS and its network distribution. Even though I have argued for the network is based on market conditions, a new owner structure could potentially change the structure for the network due to other interests or synergies.

12.7 EPILOGUE

In Denmark, there has the last decades been a rather passive political attention towards the making of hub airport in Copenhagen. Aviation has not been a significant topic on the political agenda, and aviation tended to be perceived as an industry that needed safe and financial regulation. Previously, it has not been understood as a strategical instrument for the society in order to have regional and global reach. However, during the last years, the political attention towards aviation has increased in relation to understanding aviation in a wider context in order to develop Danish aviation including the development of the hub function at Copenhagen Airport. Based on my analysis of Danish aviation I have identified a discourse, that I label as*: Growing political attention in a complex situation*. The underlying rationality for this discourse has several dimensions: First of all the historical low political attention towards aviation can be found in the fact that the hub function in Copenhagen Airport has existed since the 1950s and it has been take taken for granted by the political environment. An in addition, it is a complex industry including an hub airline with three hubs and a corporate strategy from the airport to develop low cost airline together with network airlines. However, this political attention has increased the last years due to an acknowledgement of the societal importance of SAS and the hub function in Copenhagen Airport.

This identified discourse is the foundation for the dynamic causalities between the different objects in the Danish context. A key object in the production of a hub airport in Copenhagen is the hub carrier SAS, which is the provider of most of the hub

connectivities in Copenhagen Airport. However due to the liberalization and market demands, SAS did already in the 1990s start to facilitate strategies with a focus on direct connection from Scandinavia to Europe – the decline in transfer passengers did stop in 2010, and since then been constant around 6m transfer passengers. However due to the general passenger development in Copenhagen Airport, the relative hub function has decrease. In total, since 2000 the number of transfer passenger in Copenhagen Airport has decreased by 35%. Another, important materialities is the location of Copenhagen Airport, in the southern part of Scandinavia, which has given the airport a natural position as main hub for SAS. At a regional scale, Copenhagen Airport is linked directly to the city of Copenhagen either by metro, rail or highway and to Sweden via the Oresund Bridge, and this gives the airport a solid foundation to develop its catchment area. In addition – and in contrast to other cases, especially Brussels, Zurich and Amsterdam – the layout of the main runways in Copenhagen Airport provides a situation where the local inhabitants are relatively less exposed to noise-externalities. This materiality is not given, since it is a consequence of a historically political attention in the early start of the 1980s where the framework for the spatial development of Copenhagen Airport was established along a restrictions on where new housing projects could be initiated outside the premises of the airport. The different policies towards aviation includes the privatization of Copenhagen Airport in the 1990s and consequently, the acquisition of the airport by initially Macquarie Airports in 2005. Along this process and in line with the liberalization of the aviation market, low cost airlines such as easyJet and later Ryanair did start operating in Copenhagen Airport, of course driven by airlines' expansion plans but also due to the strategies by the airport, which had dual focus on both low cost airlines and network companies. The dynamic causalities between these different objects are the foundation for the production of hub airport Copenhagen. However, there has not been an active political attention towards the decline in the hub activities at the airport, even though there has been several publication regarding the Danish aviation. It was first in 2017 that the Danish government published as new aviation strategy: *Aviation strategy for Denmark*. Here is the objective to develop Danish connectivity in order to promote economic growth, employment and domestic coherence, which is supported by several initiatives including a new tighter regulation model for Copenhagen Airport with a focus on developing transfer traffic and capacity. The challenge is whether or not this is will promote hub connectivity in a highly competitive market with a focus on direct connections within Europe. Due to the large share of transfer traffic between Scandinavia and Europe, it is not certain that the decline in hub connectivity will end. However, as CEO in Copenhagen Airport articulates, perhaps the understanding of a hub airport should be wider involving increased focus on expansion of ground transport and development of business development for the entire region.

In order to change the development of hub airports, I found in the other cases that an active political involvement can change the connectivity - aviation is not a straight-line process, but can be associated with dynamic causalities between different objects that produces this outcome.

Therefore, it is in this complex situation, with a hub airline - with operations from three different hubs - and a historical focus on direct connections, an airport with strategies to attract low cost airlines – beside a focus on network carriers – together with a low political attention, that the production of hub airport in Copenhagen Airport has taken place. However, the new aviation strategy has increased the political attention towards aviation.

In respect to a hub airport governance model including a variety of stakeholders from different areas with a common goal to achieve, has not been present in the case of Copenhagen Airport. There has been and still is different committees, however the overall political will to promote and initiate an active involvement have been lacking. In the next sections, I will elaborate more on a governance model as a facilitator for promoting aeromobilities and hub airport to the benefit of the Danish society and involved parties.

12.8 DISCUSSION IN RELATION TO CROSS-CASE ANALYSIS

In this section, I will elaborate on my Copenhagen case analysis in relation to my findings in my Cross-case analysis in Chapter 11. As I identified in my cross-case analysis; in the making of hub airports, several themes needs to be addressed from a governance perspective in making of hub airports. The elements are to some extent case-specific, but as elaborated the themes needs to be taking in to account, even though there are not vocal currently, since these themes might have a future impact on the making of hub airports. Below I will elaborate on each of the themes from my Cross-case Analysis (See Chapter: 11) in relation to the Danish case.

Policies approach to spatial planning. Spatial planning in relation to Copenhagen Airport has been guided by the *Expansion Act of Copenhagen Airport* from 1981 onward. This act defines the foundation for regional, municipality and local spatial plans, which are framing the acceptance of development plans for Copenhagen Airport and surroundings. In relation to the development of Copenhagen Airport, they define different areas of the airport and what kinds of functions that can be developed within each of these areas in the airport. As highlighted, the new *Danish Aviation Strategy* opens up for the discussion of a potential relaxation of some of the historical restrictions on some of the dedicated areas. In addition to the infrastructural development within the footprint of the Copenhagen Airport, there are spatial restrictions on residential areas outside the airport, which was formulated in the 80s after the Danish government abandoned the idea of constructing a new airport in the island of Saltholm. In relation to other cases, e.g. in Zurich, the increasing population in the near of the airport will challenges the development of aviation (see: section: 10.6.3), due to the NIMBY conflicts (See Chapter: 3 Aeromobilities). Based on these two dimensions, the spatial development within the footprint of the airport and just

outside the airport, the Copenhagen Airport itself and the associated externalities frame good foundations for allowing the airport and the associated traffic to develop.

An interesting development is the relatively good supply of ground transport to and from Copenhagen Airport. The airport is linked up with the metro, highway and rails and in addition, the Øresunds Bridge inaugurated in 2000, is providing extensive local and regional connections related to the airport. An interesting perspective is that the construction of the Øresunds Bridge was motived primarily as a way to support the city of Copenhagen in order to solve its financial challenges in the 1980s and 1990s. It is argued that the Øresunds Bridge was not a part of an aviation strategy to expand the foundation for aviation traffic; however it has generated a unique foundation for the development of aviation in Copenhagen Airport. Even though the historically political decisions, have strengthened the potential development of aviation, the development of infrastructure has not directly been due to a larger public aviation strategy, but can rather be seen as a side effect, as the main objective was to support the development of the city of Copenhagen and Denmark.

Policies approach to externalities. Due to political decisions made in the 1980s, there are restrictions on where to construct new housing areas in the local surrounds of Copenhagen Airport. Since then there have been several revisions of the environmental impact of the associated noise from Copenhagen Airport, and even though the externalities are still present, the layout of the runway system in relation to e.g. Schiphol Airport, Zurich Airport and Brussels Airport provides a relatively good framework for the airport to co-exist alongside the local communities. That said, it is always a dimension to be aware of, and the effects of a tense relationship between local communities and large infrastructures such as airports can cause problematic situations. One examples of such a situation could be the development of London Heathrow; this relationship has challenged the expansion plans for the airport. Copenhagen Airport have initiated new activities to increase the dialog with local inhabitants, and by such it illustrates that the airport is aware of its position, even though the current level of complains are relatively low, it a dimension to be aware of since it can change due to e.g. a new inhabitant composition.

Policies approach towards hub airports. Based on my analysis of the different public strategy papers from 2005 and onwards, there has been a wide acceptance of Copenhagen Airport as a vital infrastructure, where the level of connectivities provided at the airport, due to the hub function exceed the natural level of connectivity that the local catchment area can support and attract.

However, there has not been direct initiatives that relate to the development of the hub activities at Copenhagen Airport, whether it was the ground transport hub or the aviation hub. The political attitude towards e.g. aviation hub activities has been rather passive in contrast to other cases. Such as in the Netherlands with the Alders Table and the future recommendations to focus on hub activities in Schiphol, or the political

understanding of developing the hub function in Helsinki to maintain and develop the domestic and international connectivity. Further as mentioned in the Amsterdam case and in the Zurich case, there were established committees to monitor the impact of the KLM merger with Air France and Lufthansa acquisition.

Since the early 1990s, SAS has had a strategy to fly more direct flights between Scandinavia and Europe, which also is illustrated in the development of transfer traffic. There can be different reasons for such a shift; increased competition in Copenhagen Airport due to higher levels of low cost airlines or a higher demand for a European point-to-point from Scandinavian airports. It can be discussed whether the GO facility at Copenhagen Airport inaugurated in 2010 negatively impacted the decrease in transfer passengers, since this decline in transfer passengers actually began already in due to SAS's strategy to increase direct flights, which is years before the inauguration in 2010 of the GO facility in Copenhagen Airport. The GO facility did however improve the market conditions for airlines operation from this facility due to its lower charges in return for given operational efficiencies such as turnaround time, and it has predominantly been airlines such as Ryanair and easyJet that have operated from the GO facility. Overall, I would evaluate the historical political position towards hub activities as rather passive; however, the new aviation strategy has changed this.

Overall political attention to develop hub airports. Currently, political attention towards aviation in Denmark is rising. As articulated in the governmental strategy from 2017, aviation is important due to domestic coherence and connectivity, and the hub function in Copenhagen Airport provides a higher connectivity than the local catchment areas of Copenhagen and its surroundings can support. The initiatives in the governmental policy *Aviation Strategy for Denmark* from 2017 supports improved operational conditions for airlines. As stated previously, the new strategy can be seen as a raise in political attention, especially since four different ministries presented the strategy. The strategy has a focus on several aspects that need to be changed or improved. Most striking is the speed of the implementation of the new regulatory model for Copenhagen Airport, which could lower the charge level – depending on the current negotiation towards the new regulatory period from April 2019 – and therefore could have a negative financial impact for Copenhagen Airport and positive financial impact on airlines. However, this can be seen as a potential way to improve the competitive situation for Copenhagen Airport. Still, it is important to keep in mind that charge levels are not the only factor for Copenhagen Airport to be competitive: Elements such as capacity and service levels are also important factors. These two latter elements will also be partly addressed by the 38 initiatives in the *Aviation Strategy for Denmark*. The initiatives of regulation towards Copenhagen Airport can be seen as a form of increased regulation – both in terms of financial regulation and in terms of operational regulation. Whether this approach is due to a market failure – as stated in section 6.2 Governance – can be discussed. Nevertheless, I will argue that these initiatives could be seen as an intervention due to a potential market failure,

since as the Danish CAA articulates: the high charges at Copenhagen Airport have caused Denmark to miss some connectivity opportunities. Beside these initiatives related to the regulations of Copenhagen Airport, the initiatives also address elements of improving the operational conditions for airlines and improving the ease of spatial development in Copenhagen Airport. Whether these initiatives actually will increase the connectivities in Denmark and at Copenhagen Airport, remains to be seen, but in contrast to previous years, as seen in the *Report from Danish Aviation Committee* strategy, the political will to invest time (and to some extent capital[194]) in the development of aviation, illustrates the current higher political attention.

As argued in the case of Amsterdam, the high political attention towards aviation was influenced by the *Dutch disease*, which generated a form for *burning platform* that promoted a need for political understanding for aviation as a strategical instrument. In Denmark, I will argue that historically there has not been such *burning platforms* where aviation could be used for an approach to solve a societal challenge. There have been problematic situations for e.g. SAS and other Danish airlines, but disregarding these problematic situations for these airlines, there has been a political approach and understanding, that the industry had to make it on its own. As COO from SAS states by referring to the political historical thoughts on aviation: "*[The industry] will have to get by on its own. It's doing fine anyway, isn't it? Are there any signs the industry not doing fine? No, there are not, so isn't that good enough*?" (COO, SAS 2017: 20:32).

This passive approach has been difficult to change, as he continues: "*It's just impossible to get past [these thoughts], and then, some naïve belief that everything will be fine anyway without us [the politicians] having to do anything*" (COO, SAS 2017: 20:39)

These statements also point towards this passive political attention to aviation, but as I illustrated in section 12.5.2, the governmental strategy: *Growth and development in the entire country of Denmark* did present an initiative that articulated that an improvement of Danish aviation could support growth and coherence in Denmark. In this political strategy, domestic growth could be facilitated by sound Danish airlines and an improvement of Danish airports including Copenhagen Airport as a hub. This line of thought was supported by a promotion of the political support for the new *Aviation Strategy for Denmark* and the initiatives within.

[194] Whether the Aviation strategy directly will have negative financial consequence for the government, depends on the actual implementation of initiatives, but due to the Danish states ownership of Copenhagen Airport A/S by 39.2% the dividend payments could be reduced since the financial performance at Copenhagen Airport could be decreased. However, the actual dividend payments do not need to be 100% associated by financial performance since it relies on an overall dividend policy along a approach to capital structures of the company.

Therefore, I will argue that the new *Aviation Strategy for Denmark,* and the associated initiatives can be understood as a result of the new political acceptance of aviation as a strategical instrument to solve domestic challenges. This acceptance had not been the case previously as there mostly had been a regulatory political attention towards aviation based primarily on a safety and regulatory perspective.

Governance model for hub airports.
There are different stakeholder committees within the Danish Aviation sector, such as the Growth committee in Copenhagen Airport, Trade Organization for Danish Aviation[195], and Danish Aviation Committee[196]. The first two consists of different stakeholders and within the Growth Committee, a representative from the Transport and Construction Authority participate as an observer. The Danish Aviation Committee, established by the Danish Minister of Transport in 2011, including different aviation stakeholders and members appointed by the minister. Even though these committees exists and have done an extent work and analysis on the Danish aviation industry, the focus and initiatives have been on optimizing the flow machine of aviation – in line with the conventional perspective on aviation (see Chapter 2 What is a Hub Airport?).

A governance approach based on my cross case analysis (Chapter 11) with high political involvement that recognize the hub airport an active entity in promoting connectivities has been lacking. This is especially striking in relation to the cases of Amsterdam and Helsinki, where the high political attention towards is profound in order to develop connectivities based on model that bridge the interests of the state and the market.

Based on this I will in the Chapter: 13 Conclusion present a governance model for hub airports developed upon the thoughts from Jessop (see Chapter: 6.2 Governance) and the learnings from the four case studies.

[195] Own translation of: ”*Brancheforeningen Dansk Luftfart*” *(BDL)*
[196] Own translation of: ”Udvalget om Dansk Luftfart”

13 CONCLUSION

This PhD thesis is grounded in a wondering about what are the driving forces behind development of hub airports. Some hub airports have been very successful in terms of passengers throughout the last decades, while others have had a less positive development. In contrast to the conventional aviation research tradition that often seeks to explain such development by socioeconomic variables, I have argued that there is more to this development than just, for example, level of GDP or size of catchment area. My research is founded in the thoughts of aeromobilities and the new mobilities paradigm which encompasses a wider societal approach to understanding the driving forces behind mobilities. The field of research in this thesis is therefore hub airports and their societal meaning. The background for this thesis originates in the importance of hub airports and the challenges they are facing in light of overall industry transformation and their individual embeddedness in local, regional and national contexts.

The thesis therefore especially wishes to illustrate:

> *What are the driving forces, mechanism, discourses and rationalities that are associated with the development of selected European hub airports and upon evaluation of these, and what can be learned in the Danish context in relation to aviation policies and governance? Consequently, the ambition is to achieve a theoretical and empirical understanding of hub airports' development potential, and based on this, to assess the relationship between the Danish context and Copenhagen Airport.*

In order to be able to address the above, I have outlined three underlying questions for which the answers will unfold the solution to the main question.

The foundation for the three underlying questions were framed in my theoretical understanding of a hub airport, as argued in my meta-theoretical chapter; namely, a hub airport must be understood within an open system, the development are not linear and the hub airports are founded on rationalities that must be understood by interpretative understanding. In line with this I did proposed three underlying questions, namely:

1. *How can a hub airport theoretically and methodologically be understood and investigated?*

Firstly, a hub airport needs to be understood theoretically as part of an open system. A hub airport cannot be considered as a standalone entity or neutral traffic point in the global flow of passengers, but should be understood as interrelated with society. I

have found that societies create aviation, but aviation also does create societies. This was also stated by Jensen and Lassen (2011), as they articulates this in relation to mobilities in general, but I have in all my cases found that the production of aeromobilities depends on different aspects of society, which need to be considered in order to understand either the connectivity development or the infrastructural development of the hub airport. The theoretical foundation for aeromobilities is the new mobilities paradigm, and therefore an understanding of aviation relies on the dynamic process between the production and consumption. Further, a vital understanding of the production of aeromobilities relies on the acknowledgement of airports as relational and historic places.

For example, in order to understand the significant growth in number of passengers in Amsterdam Airport, the liberal mindset and the historical relation to its former colonies in the Far East need to be addressed as these have been historical drivers for the airport's current connectivity. In addition, as shown in the Helsinki case, development of long-haul connectivity needs to be understood in relation to the need for domestic and European connectivity. The infrastructural development in Zurich Airport cannot only be understood as a consequence of a given predicted demand but needs to be addressed through the federal system in Switzerland, since the modification of the runway system needs approval by the referendum of the Canton of Zurich. These are just some examples that indicate and illustrate that a hub airport cannot be considered as a standalone entity, but need to be understood in relation to local, regional, national and international relations.

Methodologically, the research of hub airports needs to be based on an interdisciplinary approach including both quantitative and qualitative methods in order to understand the dynamics between an airport's connectivities and the underlying dynamic causalities and rationalities. As illustrated in this thesis, a potential way to address and analyze hub airports can be achieved by viewing these hub airports through a set of lenses consisting of Policies and Materialities in order to encapsulate the different scales of dynamic causalities that influence the making of hub airports. An additional methodological approach based on a governance understanding of hub airports has shown to be a fruitful way of investigating the development of such societal-embedded infrastructures as are hub airports.

2. *What are the driving mechanisms and patterns of meaning behind the production of aeromobilities at selected European hub airports?*

The development of a hub airport is not a linear process. All of my cases – even though there were selected based on an extreme development of connectivity – illustrate that a hub airport cannot be understood as a linear development. It is possible to change connectivity patterns either by, for example failure of airlines, or by actively developing new connectivities. These developments of hub airports are influenced by a political attitude to develop aviation. In my case of Amsterdam there has been a

proactive attitude in solving some of the challenges the hub airport is facing; this is exemplified by the Alders Table that has the purpose to solve one dimension of the duality of aviation, here the controversy between growth and noise externalities. In the case of Helsinki, there has been a high political involvement in settling traffic rights with Russia in order to develop long-haul traffic. This illustrates that aviation is not a mechanic linear development depending only on socioeconomic variables, but that a wider political involvement can influence the airport's development.

My research design is based on the dynamic causalities between Policies and Materialities where I have found that it not only the strategies and the politics that forms the development of connectivity and infrastructure, but also the given materialities that generate the foundation for aviation to unfold. Materialities can consist of both geographical location in terms of the global position of the airport in relation to traffic flows, but also in relation to regional setup and neighboring countries and how these relationships affect development of aviation. This is illustrated in the case of Amsterdam, where the fear of being marginalized in the 1980s in relation to Germany and France; and in the case of Helsinki where the neighboring relationship to Russia has supported the ease of gaining traffic rights. In Switzerland, Zurich Airport's location surrounded by mountains, the layout of runways and the associated traffic flows over the south of Germany have influenced the development of Zurich Airport. Further, in the Brussels case I found that the location of the Brussels Airport and the traffic flows over highly dense housing areas, combined with the regional setup have challenged the development of Brussels Airport and its production of aeromobilities. My research design is based on dynamic causalities between Policies and Materialities and illustrates that the production of aeromobilities is not a linear development but must be understood in the context of Policies and Materialities.

During my research, I found that aviation must be developed based on the understanding of a hub airport that is founded in a wider context dependent on Policies and Materialities. However, aviation is filled with controversies – on one side there are the benefits of regional and global connectivity and coherence, but on the other side this advantage does not come without costs of various externalities such as land use, pollution either by noise or CO2 emission, and market-driven labor pressure or market failures. This illustrates that in order to develop hub airports and aviation there are several challenges to overcome. Depending on the local context, the challenges can take different forms, and in all my cases there are challenges to overcome in order to generate a foundation for the development of aviation. The approach to these challenges, both in terms of articulation of the challenge and a practical approach to its solution, unfolds the underlying discourse of the political attitude towards the production of hub airports.

As I have argued in all of my cases, the discourse and therefore the approach to aviation is based in an underlying rationality that lays out the initial foundation for why the production of aeromobilities is as it is. I will argue that the discourse can

explain the political motivation for a given articulation and practices to address the controversies for the production of hub airports. As argued for in the case of Amsterdam, the discourse: *Balanced hub aviation as engine for society* frames the political willingness to solve a challenging situation of the need for growth in the light of the externality of noise. The understanding of aviation as an engine for society motivates the political environment to support the development of, for example, Lelystadt Airport as well as investing political resources in solving these issues. In contrast to this discourse that can explain why the production of aeromobilities in the case of Amsterdam is positive in terms of passenger development, I will highlight the discourse I identified in the case of Brussels Airport: *Decentralized production of aeromobilities*. This study unfolds the production of aeromobilities in Belgium where there is not a unilateral focus on the development of the hub of Brussels Airport, but instead the production of aeromobilities are addressed in the context of several other airports. This explains why there is less political attention to solving some of the challenges that the hub of Brussels Airport is facing and that therefore, the political effort and will to address the controversies can be encapsulated by different discourses based on articulations and practices. I will argue that the development of hub airports and the ability and motivation for these to successfully develop depends on the overall political perception and discourse of aviation.

Governance model for hub airports

During my research and reflections on how to understand a hub airport, and how and why the production of hub airports takes place, I have collected empirical findings to develop a governance model for hub airports based on the thoughts from Jessop (see section 6.2). The basic framework for a governance model consists of platforms where the market and the state can exchanging and synthesizing objects based on:

- *Simplified models and practices* enabling a reduction in complexity, but still in line with the focus of the given stakeholders involved.
- A *knowledge of the causal processes and their relatedness,* including *assignment of responsibility and competencies* to act and coordinate.
- *A framework of methods* to align actions across different stakeholders.
- *Establishing a common worldview among stakeholders* and a system that can settle key stakeholders' focus areas, expectations and behavioral approaches.

With a departure in this model and my empirical findings, I have developed a governance model for hub airports. The foundation for this model is a wider societal understanding of hub airports where multiple and various stakeholders with different means and possibilities together can develop the hub airport and support the production of aeromobilities. Development of privatized and corporatized airports can benefit from support by different competencies represented in both the market and the state. Research based on my four cases illustrates that if there is an acknowledgement of each other's competencies, it is possible to develop aviation to the benefit of involved stakeholders.

In contrast to the common financial regulation of airports, a governance approach can solve and address challenges that can support the development of hub airports and connectivities. In my cases, I found different forms for governance models where the market and the state corporation can take several forms. In the Amsterdam case, the most profound cooperation is the Alders Table that have the objective to address the double objective: aviation growth and noise externalities. Based on my cases I have found that, beside the theoretical aspects of a platform where viewpoints can be synthesized, a governance model for hub airports must address the following aspects:

- Understand the hub airport in a wider context of regional, national and international relations.
- Maintain a political focus on one hub airport – too much decentralized political attention can have negative consequences for the hub airport's development.
- The support of a network carrier is essential to be able to maintain and develop the traffic system that is the foundation for a hub airport.
- It is vital to address externalities such as land use, noise and pollution in order for the hub airport to develop.
- To support a hub airport, it is important to have both the market – including actors such as airports, airlines, tourism organizations, labor unions and business communities, etc., and the state – including representatives from local, regional and national political institutions and appropriate ministries and governance bodies – to be involved in the making of hub airport and the production of aeromobilities. This production needs to be understood as more than just financial regulation, but as a strategic instrument with the aim of national domestic coherence and global reach.
- The production of hub airports takes place in a nexus of controversies, and therefore in order for it to develop, these controversies need to be handled or resolved.

3. In a Danish context, what can be learned from the study of the selected European hub airports?

As stated previously, this PhD is founded in the problematic situation of Copenhagen Airport and the challenges it faces regarding connectivity and especially hub connectivity. The main idea was to investigate and analyze how other societies have handled aviation and hub airports. Based on this approach, I have identified different dynamic causalities between Policies and Materialities in my selected four case studies where there has been some sort of extreme development. Further, I have argued for different discourses and their rationalities which have been associated with aviation and hub airport development.

Based on the two research questions above I will, in relation to Copenhagen Airport, recommend the following:

In terms of understanding what a hub airport is I have found in my four cases that a hub airport should be understood as a part of society and not as an independent, passive infrastructure. However, I have found that Copenhagen Airport within the political system to some extent has been perceived as a passive infrastructure that only provides capacity to the aviation sector and where the primary political interferences have been via political regulation of the airport.

Based on my aeromobilities approach where I have looked at the production of aviation and the hub airport through the lenses of Policies and Materialities, I have gained an understanding of certain contextual interdependencies related to the development of aviation. In the cases of Amsterdam and Finland I have argued that the active political involvement happened on the basis of a *burning platform* within society where aviation has been understood as a potential solution to the situation. In Denmark aviation has historically not been perceived as a strategic instrument to solve problems within society. I have argued that the political environment has perceived aviation as a rather expensive, complex and difficult sector to approach.

As I found in my other cases, the production of connectivities needs to be based on an understanding of airlines and airports as vital for its development. Especially after the deregulation and liberalization of the European aviation industry in the 1990s, it is no longer only domestic airlines that support this development of connectivity. Given this, there have been some political initiatives to support SAS and the framework conditions for Danish airlines, but the Copenhagen Airport has not been understood as a strategic instrument that could be supported by political attention. Up until 2017 the political involvement had mainly been limited to the Ministry of Transport, but due to the recognition of aviation as a driver for developing remote regions of Denmark, the political involvement is now based on a wider approach found within the Danish government which has translated to the newest aviation strategy that has a socioeconomic foundation.

As part of this strategy, a new financial regulation for Copenhagen Airport has been implemented and it is articulated based on a socio-economic perspective that airlines with transfer passengers should have a financial advantage for using Copenhagen Airport as a hub. Even though the strategy uses a socioeconomic perspective, it is remarkable that there are no initiatives within this strategy towards externalities which can be a challenge for aviation development, as shown in my other cases.

Within materialities, Copenhagen Airport has two major advantages: First of all, its natural geographic position as a hub between Scandinavia, Europe and long-haul destinations which provides a sound foundation for hub connectivities, as it has been historically. However, due to the transformation of the aviation industry and the increased competition among airlines where direct connectivities from Scandinavia to

Europe have been in focus, Copenhagen Airport has to some degree been bypassed as a hub. Secondly, Copenhagen Airport has a regional advantage due to its proximity to the city of Copenhagen and due to its spatial layout where runways are distributing traffic flows towards the sea, and not as Brussels and Zurich where traffic flows produces externalities over highly populated areas. In the 1980s there were some political initiatives to restrict housing projects especially south of Copenhagen Airport to prevent the conflict between inhabitants and development of aviation.

Historically there has been a political focus on trains and other means of transport, and aviation has only been addressed in a regulatory manner based on safety and financial regulation. However, the discourse has changed within the last couples of years because aviation is now increasingly understood as a strategic instrument that can solve domestic problems on the political agenda.

In the 1980s there was development politically where influence was decentralized on regional and international levels; e.g., EU institutions. Along this, there was a tendency towards privatization and corporatization of public owned companies based on a belief that market could handled these entities in a more efficient manner. However, as I have argued, the production of aeromobilities cannot be perceived as a stand-alone industry due to its complexities and interdependencies of regional, national and international relations. Therefore, as I found in the case of Amsterdam and Helsinki, a positive development of aviation requires some level of political attention and willingness to address and overcome the challenges facing the industry's production. There are different approaches to cooperation between the state and the industry; however, the basis for a fruitful governance approach is that the parties have a common understanding of the problems faced by each party, each party's competencies, and a mutual understanding of the objectives of the cooperation. As earlier stated the political attention had been lacking and the parties were not able to find a mutual understanding of the objectives of the Danish aviation policies. Consequently, various potential governance platforms in Denmark have not been able to articulate solutions as seen in the other cases.

Finally, based on the above findings I will highlight eleven findings of this thesis. The first three are theoretical findings, then four empirical findings and lastly four key findings in relation to Copenhagen Airport.

Theoretical findings:

Finding 1: *Hub airports must be understood through an aeromobilities approach.* The approach to researching hub airports must be founded in a wider societal understanding of aviation. The hub airport cannot be understood as a neutral traffic point, but must be understood as a relational and historical place associated with rationalities and meanings. The successful production of aeromobilities takes place in a nexus of controversies, which require acceptance and political willingness to be addressed and solved. In addition, the development of a hub airport is based in a

complex context where national, regional and global relationships are influencing how hub airports are developing. Given the recognition of aviation as an enabler that can enhance the global reach of nations, it is possible to facilitate the development of hub airports and thus, develop societies in a dynamic process with hub airports.

Finding 2: *Hub airports being researched must be understood as relational places*. Based on an understanding of hub airports as relational places, the research of hub airports must rely on a wide methodological approach that includes both quantitative and qualitative approaches. By having an explorative research design where the empirical obtained data are analyzed through the lenses of Policies and Materialities it is possible to identify the dynamic causalities between various elements that enable and limit the potential of aeromobilities production. Such an approach facilitates an understanding of the underlying discourse and rationalities that lay out the foundation for the development of hub airports.

Finding 3: *Development of hub airports must rely on a governance model.* Due to the wider understanding of the production of hub airports, the development of such needs to rely on a governance approach to bridge the interests and objectives between the hub airport and its stakeholders including airlines and representatives from local to national political level. Such a cooperation could take the form of a governance platform where a common objective is developed for the production of aeromobilities and where there are some kind of mutual understanding of different challenges and recognitions of the participants' ability to contribute to the development of hub airports and potential development of connectivities.

Beside the theoretical findings in this thesis, I will also highlight three empirical findings in relation to the production of hub airports:

Finding 4: *Hub airports need to be understood as a strategic instrument.* First of all, as based on the cases of Amsterdam and Helsinki, I have found that the political attitude towards hub airports needs to be based on a wider understanding of hub airports as a strategic instrument that, with active political involvement, are able to develop connectivities. This is in contrast to a perception of the hub airport as a passive infrastructure provider where the focus mostly is founded in a strict financial or capacity regulatory approach. This active position towards hub airports also has to be based on a wider acceptance of how the political environment can enable and support the development of connectivities and must be founded in a rationality that accepts aviation as an industry the can provide solutions to society. Therefore, one of my key findings is that the production of a successful hub airport seems to go hand in hand with high political attention.

Finding 5: *Hub airports are not free – there are significant cost related to the making of hub airports.* It is important to understand that the production of hub airports calls for an awareness of significant economic costs, both costs related to social

externalities and institutional cost. Therefore, it is vital for stakeholders and industry partners to actively assess such challenges in order to generate a viable foundation for connectivities to develop. The costs of externalities are different across my analysis cases, but proactive involvement, as found especially in the case of Amsterdam, could generate a foundation for addressing externalities, even though this may be associated cost for the involved parties.

Finding 6: *Hub airports are contested objects*. In addition to the societal costs, which can cause multiple controversies, I will, based on my empirical findings, highlight that the production of hub airports and aviation largely is founded in global controversies. These can both be in relation to challenging conflicts with neighboring countries, as found in the Zurich case. However, cross-national relations can also generate leverage, as illustrated in the Helsinki case and given its historical and geographical relationship to Russia. Here it is essential to pinpoint that the development of hub airports also must address national and global considerations, which require a wider societal involvement.

Finding 7: *Hub airports require long-term focus and commitment.* It is important to understand that the development of a hub airport is a long-term process due to all the associated complexities and dynamic causalities. Even though there is a positive political understanding of aviation to the development of regional or national infrastructure, the acquisition of aircrafts and assessment of externalities and relations on scales can take decades.

In relation to my analysis of Copenhagen Airport, and on the basis of my findings in my cross case analysis, there are three additional findings I will highlight that are important to understand and develop for Copenhagen as a hub

Finding 8: *Historically, there has been a lack of political attention towards Copenhagen hub airport.* First, despite the negative development of hub connectivities in Copenhagen Airport during the last decades, there has within the political environment of Denmark been a passive, non-strategical approach to this challenge. The political approach has been based on a financial and capacity regulatory approach and aviation have not been considered as way to develop Denmark in the global context. I have founded that despite several contributions from the aviation industry to increase political involvement, it is only in the latest public aviation strategy where the Danish government have a wider socio-economic approach to development of hub aviation in Denmark. This strategy can be criticized for its increased financial regulation and limited initiatives to address some societal controversies. However, the fact that development of Copenhagen Airport as a hub now within the Danish government is considered a strategic enabler for national prosperity is a major shift in the understanding of aviation; and therefore, this could itself be a motivation for increased positive political involvement.

Finding 9: *Hub function in Copenhagen Airport has been weakened.* The development the last decades of Copenhagen Airport and SAS - as hub carrier - has challenged the production of the hub function. It is in this complex situation, with a hub airline - with operations from different three hubs - and a historical focus on direct connections, an airport with strategies to attract low cost airlines – beside a focus on network carriers – together with a low political attention, that the production of hub airport in Copenhagen Airport has taken place. However, the new aviation strategy has increased the political attention towards aviation.

Finding 10: *Copenhagen Airport has a strong potential as hub for developing further long-haul traffic.* The geographical position of Copenhagen Airport has potential for further developing long-haul traffic. The island Amager and its central location between Scandinavia and Europe, as well as its close proximity to the city of Copenhagen and Sweden provide a strong foundation for development of traffic. Along with the airport's existing runway layout where externalities are limited, especially compared to my findings in Brussels and Zurich, generates a sound opportunity for further development of traffic.

Finding 11: *There is a need for an increased governance approach to develop Copenhagen Airport as a hub.* Despite the recent increased political understanding of Copenhagen Airport, there are still not established a governance platform bridging market and state, where mutual understanding are articulated in relation to the objectives of Danish aviation. Such a platform can take many forms, but cooperation should be based on positive and active involvement from different scales of stakeholders, and the platform needs to be founded in a understanding of the airports embeddedness in society, and not only in terms of a passive infrastructure that requires regulation. As illustrated in the case of Amsterdam Airport with the establishment of Alders Table not all stakeholders were pleased with the result, but in order to further develop Amsterdam as a hub airport in the light of externalities this governance model did find potential solution for the challenges. Political involvement can be perceived negatively, but the awareness can also generate an understanding and engagement in finding potential solutions. In contrast; in the case of Brussels, I found that lack of national political involvement – no matter the reasons – so far have generated a situation where the development of the hub airport does not live up to its full potential.

14 PERSPECTIVES

During this PhD I have been debating with colleagues, friends and relatives regarding this thesis and the main question of what makes a hub airport, and in particular what does it require for Copenhagen Airport to further develop its position as a hub airport. A topic in the debate has been focusing on the costs of operating in the airport, based on: If Copenhagen Airport become less expensive, then SAS – as main hub carrier – can develop its network to the success of both Copenhagen Airport and SAS. Well, that is of course a sound statement, but as I have shown in this thesis, the decrease in hub activity at Copenhagen Airport, began decades ago in a response to liberalization. The market development towards more direct connections within Europe, has decreased the hub function in Copenhagen Airport due to a decrease in the transfer traffic between Scandinavia and Europe.

Copenhagen Airport has in 2017 deceased the overall charge level by 10% and introduced a hub incentive program in order to increase the economic incentive for using the airport as a hub. Further, the charge negotiations in 2018 between the airlines and Copenhagen Airport can potentially further provided economic incentive for airlines to use the airport as a hub. Thereby, it should be possible for the airport to increase its function as hub to the benefit for society.

However, if this does not work due to the market development; and SAS, as main hub carrier, cannot generate a sound business model by increasing the transfer product in Copenhagen Airport, what should then be done? A further reduction of operating costs, could be an argument, but other approaches could also be applied.

As argued for in this thesis, airports should not be understood as passive infrastructures, but the airports needs to be understood as an active infrastructure that develop connectivities. Therefore, other approaches could be applied to develop the hub. The suggestions below are thoughts that have developed through my research the last couple of years.

In order to develop the hub in Copenhagen Airport several elements could be taking in to consideration. The essential part is to understand the airport as an active part of the society, where several stakeholders are engaged not in increasing the regulatory framework, but by having an increased and wider understanding of the airport as an enabler for Denmark to expand into the global.

Consider the following thoughts:

- Copenhagen Airport as a hub, understood as a strategical infrastructure with a nexus of different modes of transport to generate a gravity center for economic development. The development of businesses around the airport includes business headquarters, conference centers and other business' that

need global reach[197] - this consideration is in line with the Schiphol Airport that provided ground for various international corporations.

- Copenhagen Airport as a hub for airlines operating between Asia, Middle East and America. Historically, this have been tried e.g. with Air India in 2011[198] in a process involving the Danish Transport Minister, however the attempt did not succeed, but the business model do exist in e.g. Amsterdam Airport with Jet Airways from India.

- Copenhagen Airport as a facilitator for enabling connections between e.g. low-cost airlines and network carriers operating long-haul destinations. By being a facilitator for such operations, the foundation for increasing global reach will develop. However, this process requires various conflicting airline business' models to corporate, and therefore the approach can be difficult to apply.

- Copenhagen Airport as active entity in developing relationships to other airports – as seen in the case of Helsinki and case of Amsterdam – to support future global connections. Such an engagement could leverage the political attention towards Copenhagen Airport in the decision process of where to allocated future capacities.

- Copenhagen Airport as active participant in addressing the global challenge associated with externalities produced by the aviation sector. Such an involvement could be together with airlines, aviation industry or universities where the airport could be used for testing facility or by providing insights or knowledge.

- Copenhagen Airport strategical articulated as e.g. "*Global Connections for Denmark"*. This articulation or similar founded in what the airport does for society – not in terms of jobs or financial contribution, but as a part of a large narrative of the airports function for the Danish society. This can help to gain further political understanding of the airport as the enabler for global connectivity. This is in line with the strategic vision in Schiphol Airport: "*Connecting to compete and Connecting to complete*"

These lines of thought can be challenging to address for several reasons. The considerations and approaches will involve several stakeholders with different strategic directions. Further, the process will require resources such as facilities at the

[197] This is in line with some of the recommendation from Copenhagen Economics, presented in the report: "*Der er noget i luften*" [In English: "*There is something in the Air*"] (Copenhagen Economics, 2009) – however these recommendations have not been implemented.
[198] See: https://www.check-in.dk/air-india-har-kig-paa-koebenhavn/ from 2011 [In English: "*Air India consider Copenhagen*"]

airport, financial resources or time and additional there could also be challenging legal frameworks. However, these lines of thoughts could generate a possibility for further development of Copenhagen Airport as a hub. Essentially, most of the initiatives requires involvement from several stakeholders and due to the increasingly political attrition towards aviation and the initiatives proposed in *Aviation Strategy for Denmark* in 2017; there could be a window of opportunity to develop the understanding of Copenhagen Airport as an active part of society, to support the nation's global reach. Therefore, the suggested airport governance model could be a platform for such future initiatives.

15 FURTHER RESEARCH

The research on airports and aviation based on thoughts from aeromobilities is not very developed compared to the conventional aviation research (see section: 2.4 Field of Aviation and Airport Research). The societal perspective on airports advanced in this thesis calls for additional research, where the approach based on dynamic causalities and discourses enables new understandings of the driving forces behind connectivities. This approach can apply to several dimensions of aviation at different scales. Therefore, on the basis of this thesis, I will below suggest three themes for further research. The themes have different scales and perspective, but all departure in understanding of aviation and airport and the associated: "*mobilities do not 'just happen' or simply take place place*" (Jensen, 2013)

Research theme 1: *Investigate Airport alliances*
This research theme would be investigating cooperation between airports in order to stimulate connectivities between these traffic points. The stimulation could take several forms such as promotion towards business and leisure market. The focus of the research could relate to understanding barriers for cooperation such as cultural differences, traffic rights along local, regional and national context. One of the results could be development of a framework for strategic airport cooperation.

Research theme 2: *Denmark in the global*
This research theme would be trying to understand how and where Danes or descendants from former Danish citizens live across the world. People that still have some kind of historical and present relations to Denmark and have Denmark as a reference point in memory. This research could result in a mapping of the Danish relations across the world – an insight that could be used to promote future connectivities to areas around the world, which have a strong link to Denmark.

Research theme 3: *Airports in the local*
This research theme would research different collaboration models – or lack of them – between airports, inhabitants close to airport and authorities. The research could try to unfold different approaches to this potential conflict including various politics and strategies. The research could include social mappings of inhabitants in relation to noise exposure in order to understand the societal approach to the conflict. The result could be to develop a model of how to approach this potential conflict in order to develop connectivities.

I hope that these suggestions will help and motivate future researches to develop the thoughts from aeromobilities to increase the understanding of aviation to the benefit for academia and society.

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APPENDICES

Appendix A. Connectivity data

Appendix B. Interview material

Appendix C. Case of Amsterdam Airport

Appendix D. Case of Helsinki Airport

Appendix E. Case of Brussels Airport

Appendix F. Case of Zurich Airport

Appendix F. Case of Copenhagen Airport

Appendix A. Connectivity data

This appendix comments on the different quantitative data types for analyzing connectivities, such as capacities, traffic flows, passenger distribution of each case airport as well as the NetScan model for evaluating connectivities.

See introduction to quantitative date in section: 5.3 Data Within an Open System

Depending on the purpose, the data will be generated from different sources.

1. Seat capacity generated from SRS Analyzer database (SRS seat data).
2. Passengers flow is generated from MIDT Sabre database (MIDT data).
3. Connectivity data generated from ACI and its *Airport Connectivity Report* published in 2014, 2015, 2016 and 2017 (ACI Europe, [year of the reports]).
4. Level of passengers is generated from public traffic publication by relevant airports or from Copenhagen Airport's own passengers data. Data from individual airports are labelled with the given source. Data from CPH is being labelled as (CPH data).

Remarks to the data sets:

Ad 1) Regarding SRS Analyzer (SRS seat data):
Seat capacity is based on actual production scheduled reported from airlines.

I have chosen to base the data on marketing airlines, not operational airlines, since this adjust potential outsourcing to other airlines, and therefore I'm analyzing the entire production of an airline company disregard of who actual conducts the production of capacity.

The data represents departing seats or departing capacities. Departing seats are numerical larger compared to departing passengers, due to load factor.

The timeframe for SRS seat data is 10 years: From 2008-2017.

The different segments for traffic flows I use in the thesis are: Domestic, Europe and Long haul destinations. Based on SRS definition:

Domestic: Destinations within the given country. For Denmark, this includes the following airports: CPH, AAL, AAR, KRP, RNN, BLL, FAE, SGD and EBJ. By this definition Vágar Airport (FAE) on the Faroe Islands, is included along airports with

scheduled traffic in Denmark. Greenland is not included in this definition of domestic Danish traffic.

Europe: Destinations of: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and United Kingdom.

Long haul: Destinations outside the defined areas of domestic and European destinations.
In SRS data set Norwegian includes the two airline codes: DY and D8

Ad 2) Regarding MIDT Sabre data (MIDT data)
Passengers' flow data are based on a calibration conducted by MIDT Sabre before presented in the database.

This dataset contain passenger data and is used for analyzing transfer flows.

The timeframe is 2010-2017 – since due to lack of data prior to 2010. Only September month is selected to limit the data; For example one month in one year e.g. in Brussels Airport includes one average more than 30.000 lines in excel. September month was chosen, since holydays in the spring and in the summer can screw the data sample. It is not an optimal solution, but this selection provides a good indicator for transfer levels and split.

The different segments for traffic flows I use in the thesis are Domestic, Europe and Long haul. Based on MIDT definition:

Domestic: Destinations within the given country. For Denmark, this includes the following airports: CPH, AAL, AAR, KRP, RNN, ODN, BLL, SGD and EBJ

Europe: Destinations of: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faeroe Islands, Finland, France, Georgia, Germany, Gibraltar, Greece, Hungary, Iceland, Ireland, Isle Of Man, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Svalbard + Jan Mayen, Sweden, Switzerland, Ukraine, United Kingdom

Long haul: Destinations outside the defined areas of domestic and European destinations.

The MIDT data can be used to evaluated traffic flows, However, there are different kinds of transfer flows; where passengers travel from departure airport to arrival airport via one hub airport or several. Depending on the different flows, these are labelled differently. For example a flow where a passenger travels only from Copenhagen Airport to Schiphol Airport, is below illustrated as: [**CPH**] – [AMS], or a passenger travelling from Frankfurt Airport via Copenhagen Airport to Washington Dulles International Airport. This is illustrated as: [FRA] – [**CPH (hub)**] – [IAD].

- **Local departing passenger**: [**CPH**] – [AMS]
- **Beyond passenger**: [**CPH**] – [AMS(hub)] – [IAD]
- **Behind passenger**: [FRA] – [**CPH (hub)**] – [IAD], CPH is the last hub airport, before final destinations, no matter how many airports before.
- **Bridge passenger**: [BKK] – [AMS(hub)] – [**CPH(hub)**] – [OSL(hub)] – [IAD], there are connecting airports before and after CPH before final destination.

By a distinction between Local departing passenger and Transfer passenger from e.g. Copenhagen Airport's perspective, this means that:

- Local departing passenger: Local departing passenger and Beyond passenger
- Transfer passenger: Behind passenger and Bridge passenger

Ad 3) Regarding Connectivity data from ACI, Europe (ACI Europe, [year of the reports]).
Connectivity data from ACI is based on data and calculations from SEO Economics and the NetScan approach. The data is based on only one week of data (3rd week of June), (ACI Europe, 2014).

The data: *Airport connectivity*, *Direct connectivity*, *Indirect connectivity* and *Hub connectivity* are retrieved from *Airport Connectivity Report* published in the years 2014, 2015, 2016 and 2017. However, the reports to not contain information for all years, mostly only values from the publication year and the yearly data a decade before - based on growth rates. In order to visualize several years, I have made an extrapolation in order to have an estimate for the years, where I did not have data. Below I have illustrated which years that are based on an extrapolation.

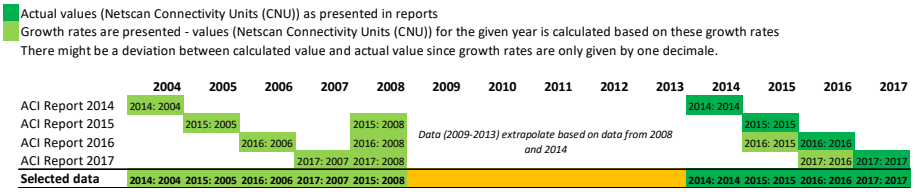

Figure 40: The Airport Connectivity Report presents the Netscan Connectivity Units (CNU) in the publication year and the growth rates 10 years back. However the years 2009-2013, needs to be extrapolated in order to visualize the yearly development. (Author's creation

Ad 4) Regarding level of passengers at airports.
Levels of passengers are retrieved from airport databases (reports and for the case of CPH, the airports own database). These data are the actual level of passenger at each airport. There can be variation in reported data depending on various definitions. Below I will shortly present the generic types of passengers:

Total passengers are the total passengers at the airport. There can be different definition, whether this includes aviation staff, babies etc. But it represent the overall level of passengers.

Transfer passengers, are passengers that uses the airport between two destinations. A transfer passenger arrive with one plane and leave with another – in contrast to a Transit passenger, that stays on the same plane during a stopover.

O&D passengers, (Origin & Departing) are passengers that arrive and departure from the airport.

Local departing passengers are level of passengers that depart from the airport, this does not include Departing, Transfer or Transit passengers.

Total passenger level are the sum of O&D passengers, Transfer passengers and Transit passengers.

Appendix B. Interview material

In advance of all my interviews, I did send an email to the interview person with an introduction to the PhD project and themes for the interview. There have been small modifications in the text along the research project, and for the Danish interviews the text was translated to Danish. The presented text has been used for case interviews in Finland and Switzerland

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Regarding Ph.D. project about an understanding of politics and strategies behind hub airports

Who I am:
My name is Jens Bloch and I'm 37 years old. I have a background from Copenhagen Business School, where I graduated in 2009 with a Masters degree in Finance & Strategic Management (cand.merc.FSM). After my degree, I have worked in Copenhagen Airport as a business analyst with a focus on regulation, risk assessment and long term planning. In early start of 2015 I got the opportunity to begin this industrial Ph.D. which I'm working on fulltime.

Outline of the Ph.D. project:
International connectivity is a key element for maintaining and developing business environments and tourism. It is important for companies to have frequent connections to the world in order to meet customers, and also for the transport of goods. There is fierce competition among European airports about where airlines are placing new capacity. In addition to competition for growth; many airlines are struggling to keep up with changing business models, and are, year-by-year, initiating new cost saving programs. It is based on this problematic and challenging background this project is founded. Instead of a primary focus on airline business models and market conditions, the **focus will relate to an understanding of politics and strategies that have formed the current situation for the airport and the aviation setup**. The research questions driving this Ph.D. project will be based on a question of how European societies handle and relate to the development of airports, which are important drivers for regions and nations. How is it possible to extract knowledge and best practice in Europe in order to leverage the societal knowledge of how to best handle aviation?

Based on these thoughts, the project will investigate the 3 following research questions:

1. How do hub airports affect and contribute to regions and nations?
2. How are regional and national aviation policies, strategies, transport policies, planning and infrastructural investments interlinked with the development of airport hubs?
3. How can successful strategies, policies and infrastructural investments be implemented in hub airports?

The primary research will be conducted via case studies of four European airports. The research will rely on both quantitative (e.g. air traffic database) and qualitative data (e.g. policies and strategy documents and interviews). Currently; I'm in the final phase of collection and collation of my qualitative data which will continue throughout 2017. So far, 4 European hub airports have been selected based on a significant growth in hub function: Amsterdam, Helsinki, Brussels and Zurich.

Interview themes:

The interviews I would like to conduct will have the purpose of generating an understanding of politics and strategies that have formed the current situation for the airport and aviation setup. In order to have an open dialog; the interview will be based on themes that – hopefully – will generate a holistic and context-depending understanding of the current situation. Below I have listed the three themes and examples of questions related to each theme. The questions are not final, but indications of topics and elements I would like to address.

Transport politics

How has the development in aviation politics been? – What have been critical elements or tipping points in this development? How is the aviation policy linked to other national policies? What is the overall purpose or rationality of the aviation policy – are there multiple goals? How are they prioritized?

Who are formulating the aviation policy? Transport rights - how are they settled? Geographical location – has this always been a driver?

Organization of aviation

What kind of stakeholders are there? Is there an organizational alignment among stakeholders, and how are stakeholders involved? How has this cooperation among stakeholders developed over time? How is the relationship to the local community? How are the relations to other parts of the country? Are there any destination marketing committees? Have there been organizational challenges? How are these challenges solved?

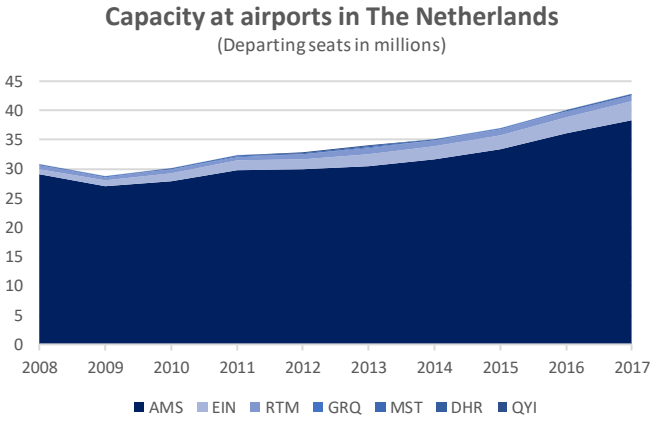
Infrastructural investments

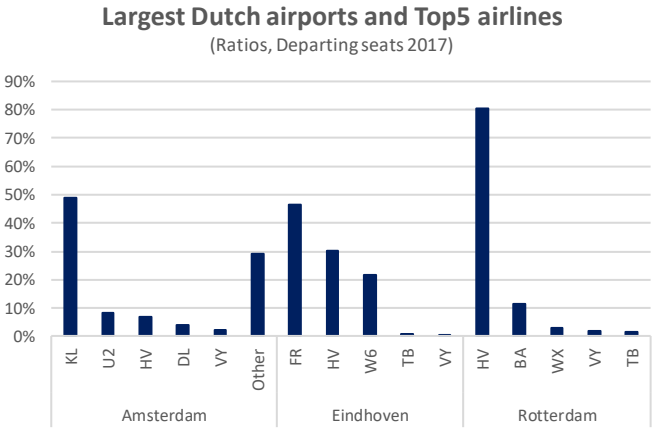
How has the infrastructure developed over time? How is the airport connected to other parts of country? What have been the driving forces of developing infrastructure? What is the long term goal for infrastructure development? How is the infrastructure funded? Who are involved in deciding infrastructure investments? How is the regulatory setup for airport? What is the background for this regulatory set up, and who is the regulator

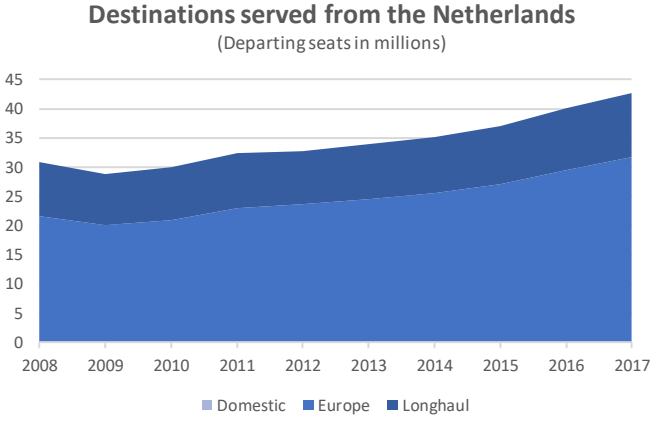
Appendix C. Case of Amsterdam Airport

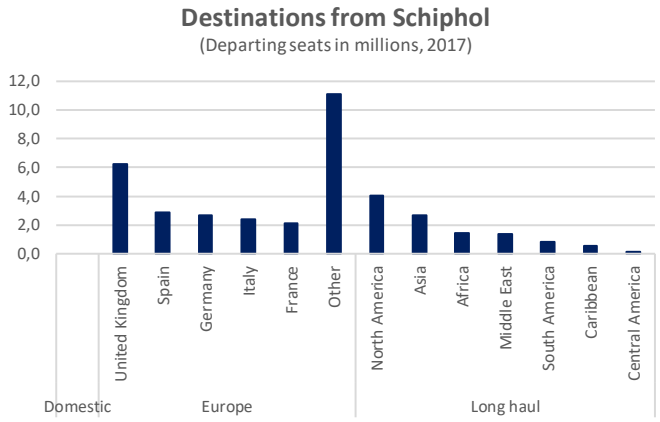
In this appendix different forms for connectivities in relation to the Netherlands and Schiphol Airport. The data is based on SRS departing seat capacities (SRS seat data) and ACI Connectivity data based on the NetScan model (ACI Europe, 20XX).

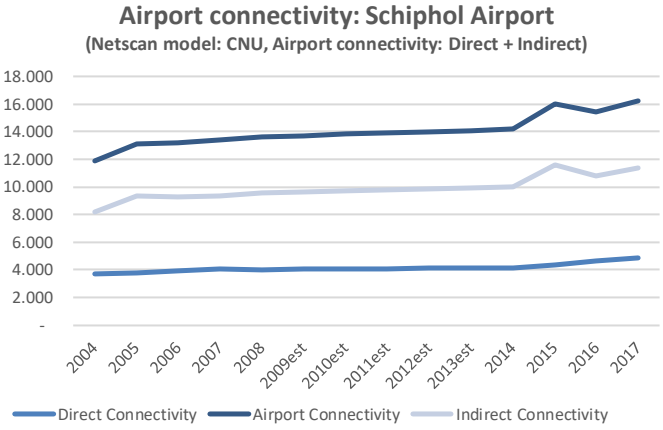
See next page

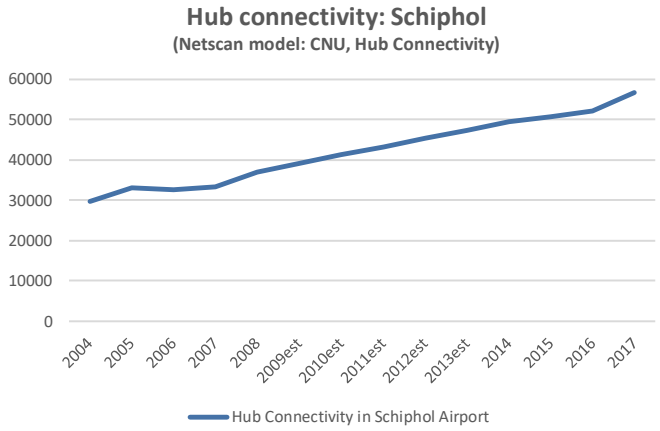

Capacity at airports in The Netherlands
(Departing seats in millions)
45
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
AMS
EIN
RTM
GRQ
MST
DHR
QYI


Largest Dutch airports and Top5 airlines
(Ratios, Departing seats 2017)
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
KL
U2
HV
DL
VY
Other
FR
HV
W6
TB
VY
HV
BA
WX
VY
TB
Amsterdam
Eindhoven
Rotterdam


Destinations served from the Netherlands
(Departing seats in millions)
45
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Domestic
Europe
Longhaul


Destinations from Schiphol
(Departing seats in millions, 2017)
12,0
10,0
8,0
6,0
4,0
2,0
0,0
United Kingdom
Spain
Germany
Italy
France
Other
North America
Asia
Africa
Middle East
South America
Caribbean
Central America
Domestic
Europe
Long haul

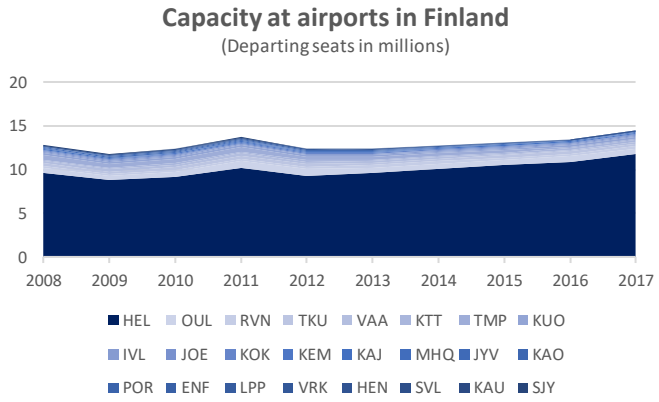

Airport connectivity: Schiphol Airport
(Netscan model: CNU, Airport connectivity: Direct + Indirect)
18.000
16.000
14.000
12.000
10.000
8.000
6.000
4.000
2.000
-
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Direct Connectivity
Airport Connectivity
Indirect Connectivity

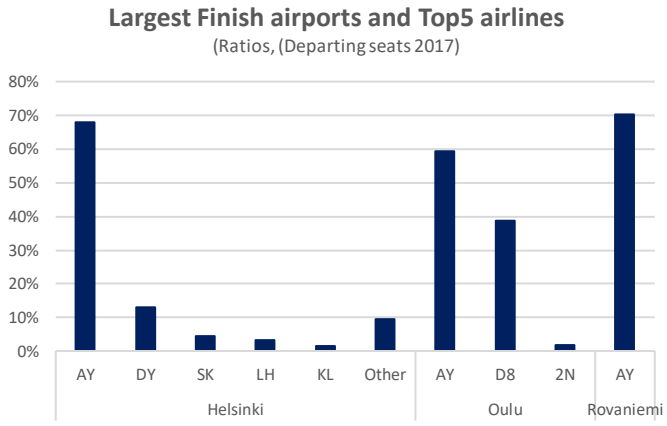

Hub connectivity: Schiphol
(Netscan model: CNU, Hub Connectivity)
60000
50000
40000
30000
20000
10000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Hub Connectivity in Schiphol Airport

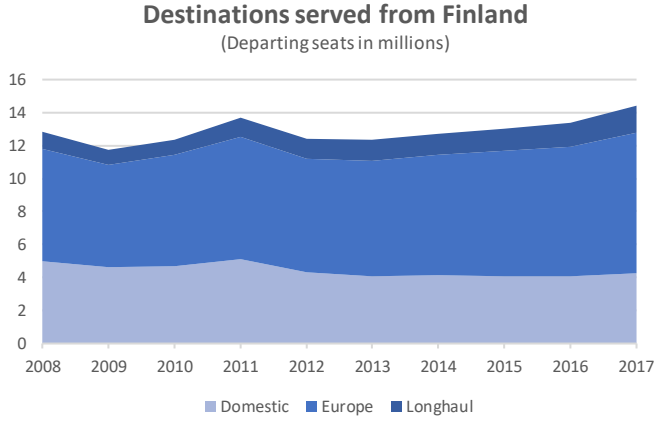
Appendix D. Case of Helsinki Airport

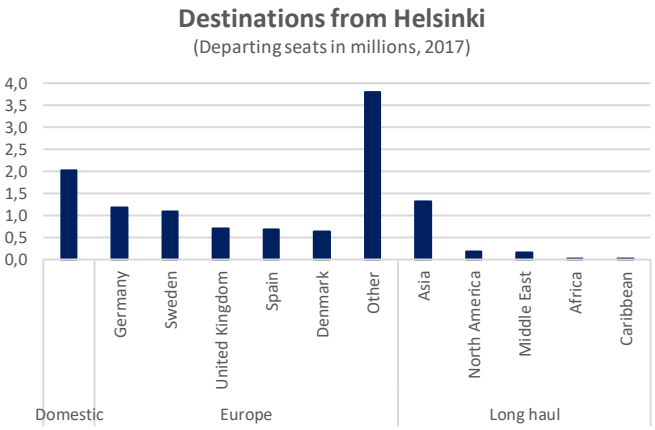
In this appendix different forms for connectivities in relation to the Finland and Helsinki Airport. The data is based on SRS departing seat capacities (SRS seat data) and ACI Connectivity data based on the NetScan model (ACI Europe, 20XX).

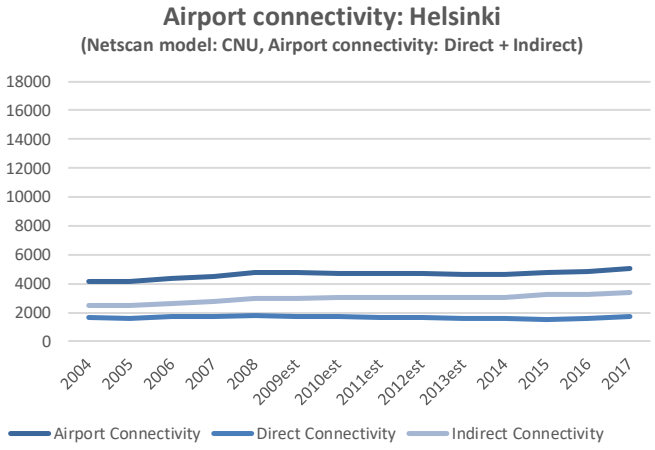
See next page

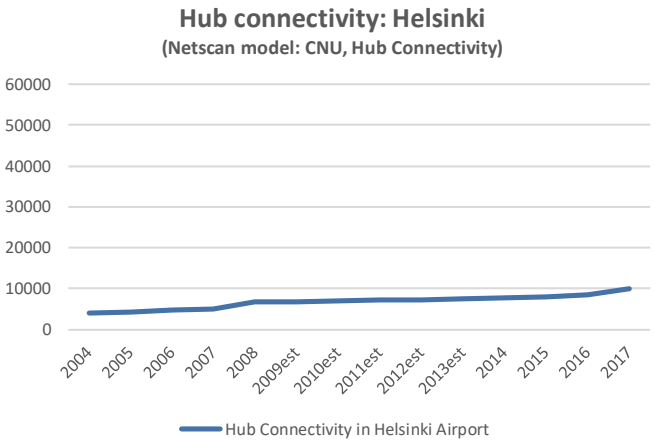

Capacity at airports in Finland
(Departing seats in millions)
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
HEL
OUL
RVN
TKU
VAA
KTT
TMP
KUO
IVL
JOE
KOK
KEM
KAJ
MHQ
JYV
KAO
POR
ENF
LPP
VRK
HEN
SVL
KAU
SJY


Largest Finish airports and Top5 airlines
(Ratios, (Departing seats 2017)
80%
70%
60%
50%
40%
30%
20%
10%
0%
AY
DY
SK
LH
KL
Other
AY
D8
2N
AY
Helsinki
Oulu
Rovaniemi


Destinations served from Finland
(Departing seats in millions)
16
14
12
10
8
6
4
2
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Domestic
Europe
Longhaul


Destinations from Helsinki
(Departing seats in millions, 2017)
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
Germany
Sweden
United Kingdom
Spain
Denmark
Other
Asia
North America
Middle East
Africa
Caribbean
Domestic
Europe
Long haul

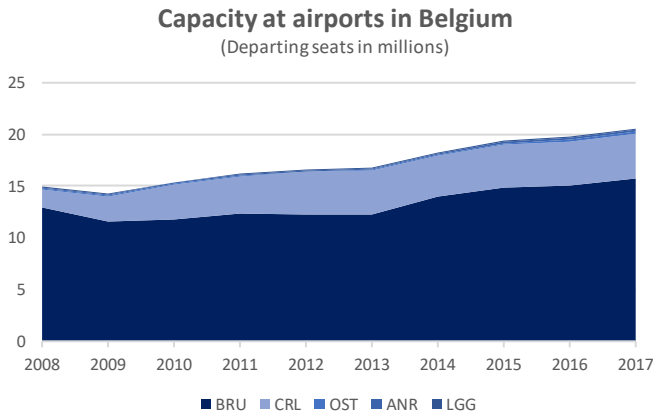

Airport connectivity: Helsinki
(Netscan model: CNU, Airport connectivity: Direct + Indirect)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Airport Connectivity
Direct Connectivity
Indirect Connectivity

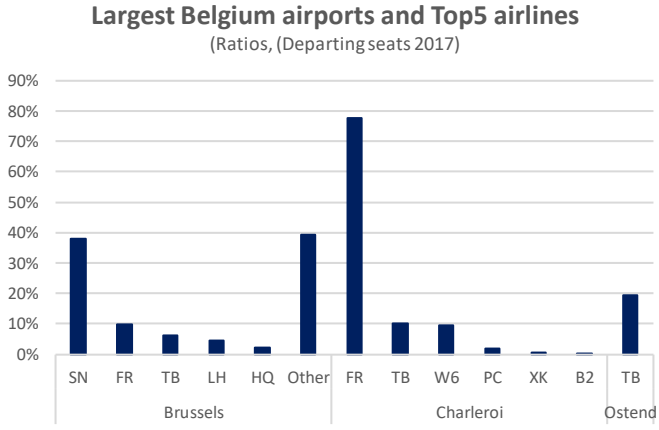

Hub connectivity: Helsinki
(Netscan model: CNU, Hub Connectivity)
60000
50000
40000
30000
20000
10000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Hub Connectivity in Helsinki Airport

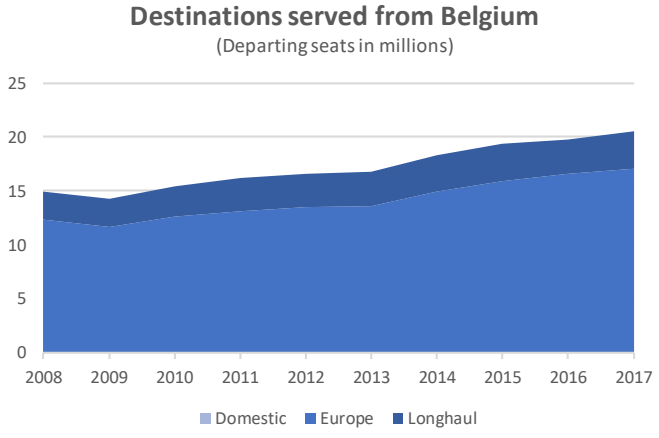
Appendix E. Case of Brussels Airport

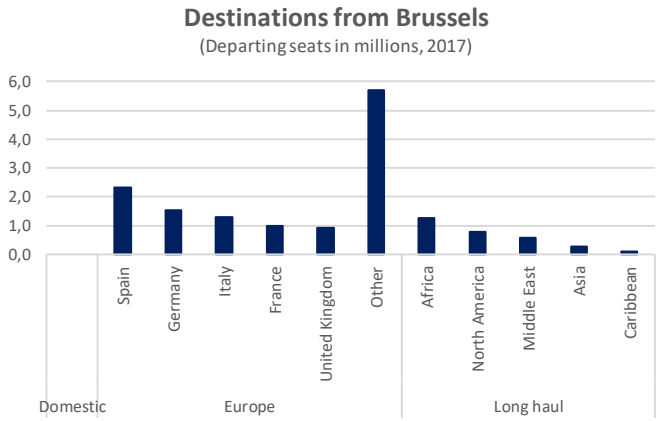
In this appendix different forms for connectivities in relation to the Belgium and Brussels Airport. The data is based on SRS departing seat capacities (SRS seat data) and ACI Connectivity data based on the NetScan model (ACI Europe, 20XX).

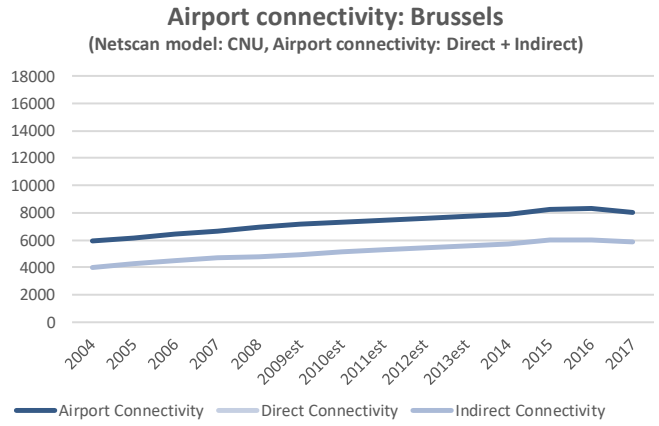
See next page

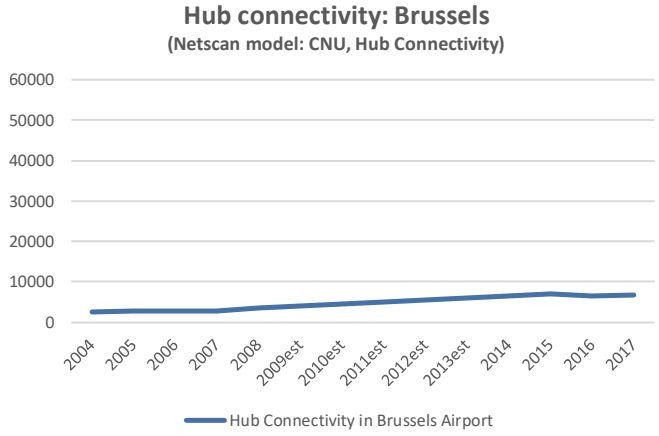

Capacity at airports in Belgium
(Departing seats in millions)
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
BRU
CRL
OST
ANR
LGG


Largest Belgium airports and Top5 airlines
(Ratios, (Departing seats 2017)
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
SN
FR
TB
LH
HQ
Other
FR
TB
W6
PC
XK
B2
TB
Brussels
Charleroi
Ostend


Destinations served from Belgium
(Departing seats in millions)
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Domestic
Europe
Longhaul


Destinations from Brussels
(Departing seats in millions, 2017)
6,0
5,0
4,0
3,0
2,0
1,0
0,0
Spain
Germany
Italy
France
United Kingdom
Other
Africa
North America
Middle East
Asia
Caribbean
Domestic
Europe
Long haul

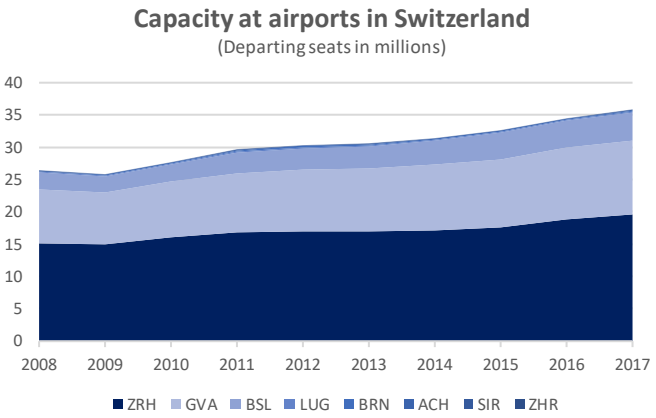

Airport connectivity: Brussels
(Netscan model: CNU, Airport connectivity: Direct + Indirect)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Airport Connectivity
Direct Connectivity
Indirect Connectivity

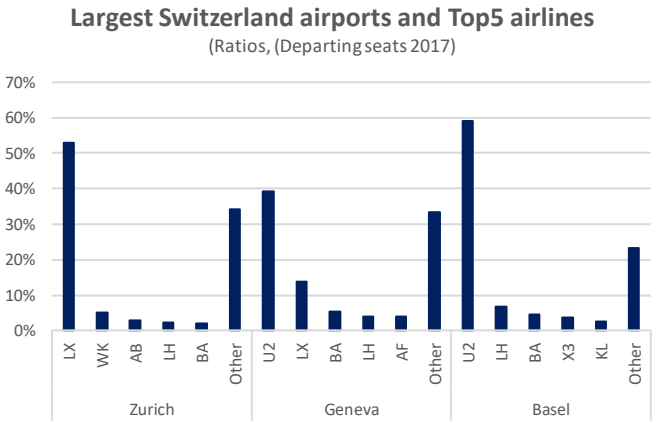

Hub connectivity: Brussels
(Netscan model: CNU, Hub Connectivity)
60000
50000
40000
30000
20000
10000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Hub Connectivity in Brussels Airport

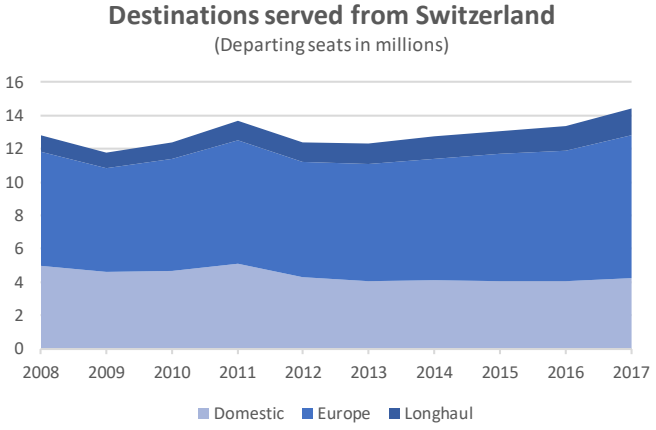
Appendix F. Case of Zurich Airport

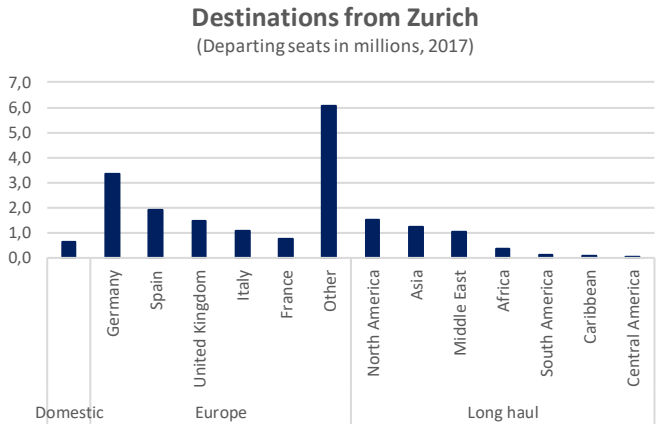
In this appendix different forms for connectivities in relation to the Switzerland and Zurich Airport. The data is based on SRS departing seat capacities (SRS seat data) and ACI Connectivity data based on the NetScan model (ACI Europe, 20XX).

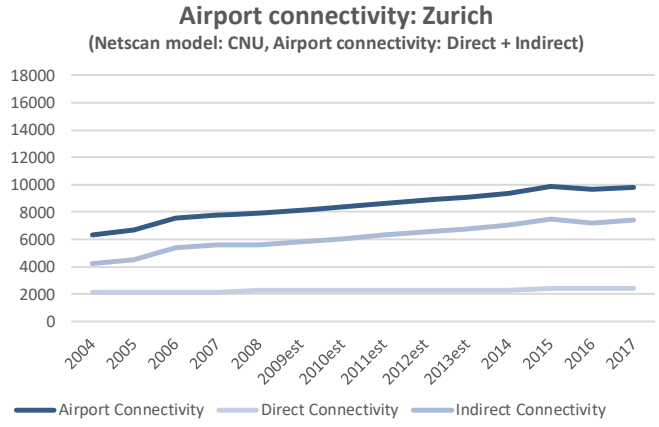
See next page

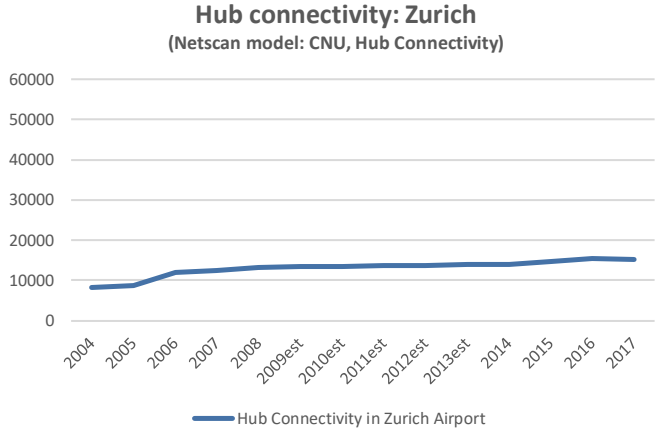

Capacity at airports in Switzerland
(Departing seats in millions)
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
ZRH
GVA
BSL
LUG
BRN
ACH
SIR
ZHR


Largest Switzerland airports and Top5 airlines
(Ratios, (Departing seats 2017)
70%
60%
50%
40%
30%
20%
10%
0%
LX
WK
AB
LH
BA
Other
U2
LX
BA
LH
AF
Other
U2
LH
BA
X3
KL
Other
Zurich
Geneva
Basel


Destinations served from Switzerland
(Departing seats in millions)
16
14
12
10
8
6
4
2
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Domestic
Europe
Longhaul


Destinations from Zurich
(Departing seats in millions, 2017)
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
Germany
Spain
United Kingdom
Italy
France
Other
North America
Asia
Middle East
Africa
South America
Caribbean
Central America
Domestic
Europe
Long haul

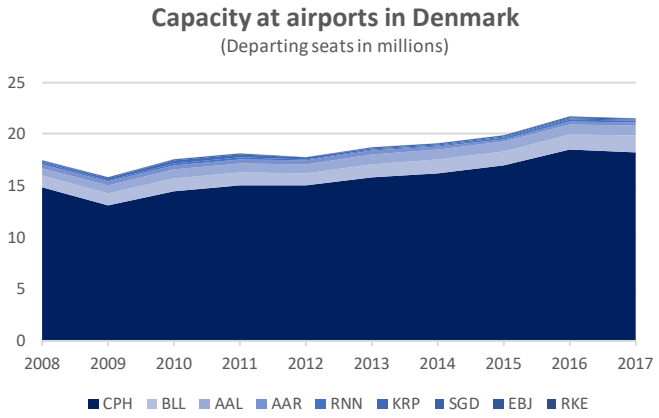

Airport connectivity: Zurich
(Netscan model: CNU, Airport connectivity: Direct + Indirect)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Airport Connectivity
Direct Connectivity
Indirect Connectivity

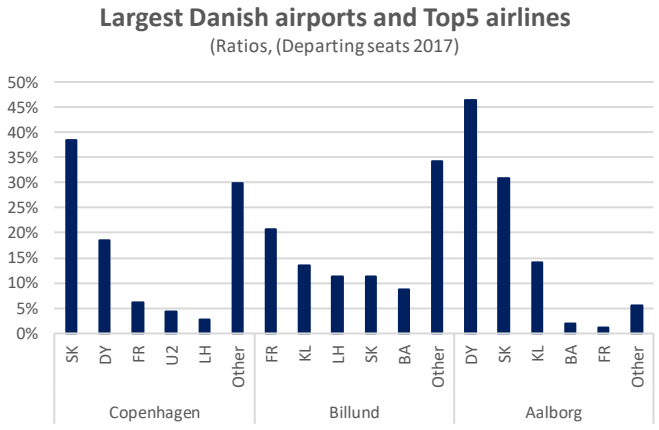

Hub connectivity: Zurich
(Netscan model: CNU, Hub Connectivity)
60000
50000
40000
30000
20000
10000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Hub Connectivity in Zurich Airport

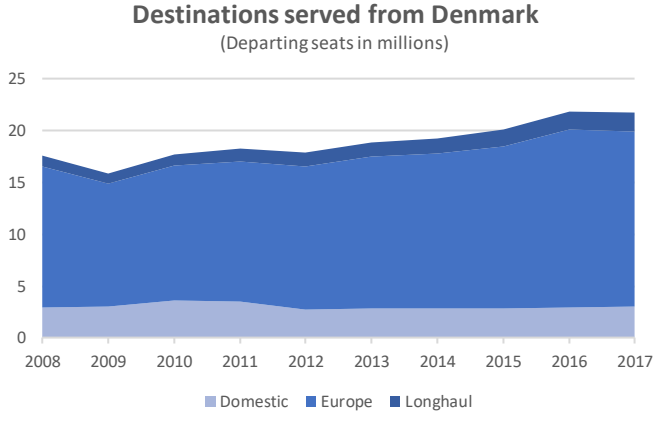
Appendix F. Case of Copenhagen Airport

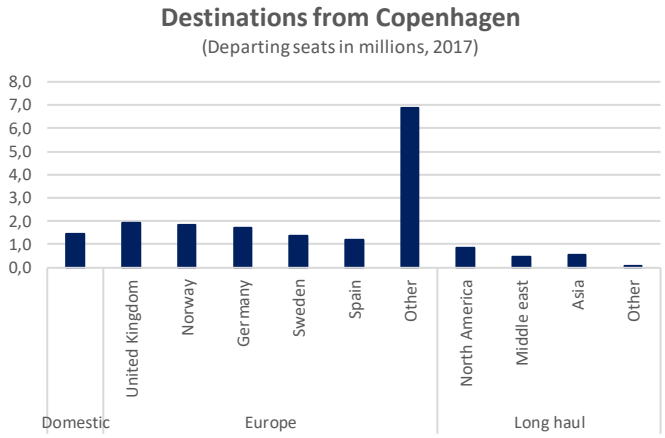
In this appendix different forms for connectivities in relation to the Demark and Copenhagen Airport. The data is based on SRS departing seat capacities (SRS seat data) and ACI Connectivity data based on the NetScan model (ACI Europe, 20XX).

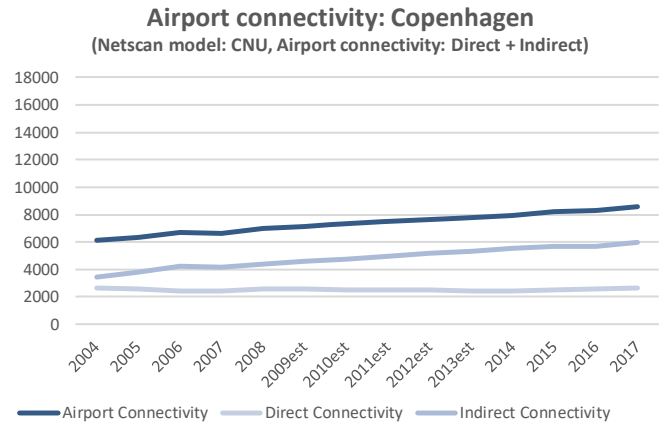
See next page

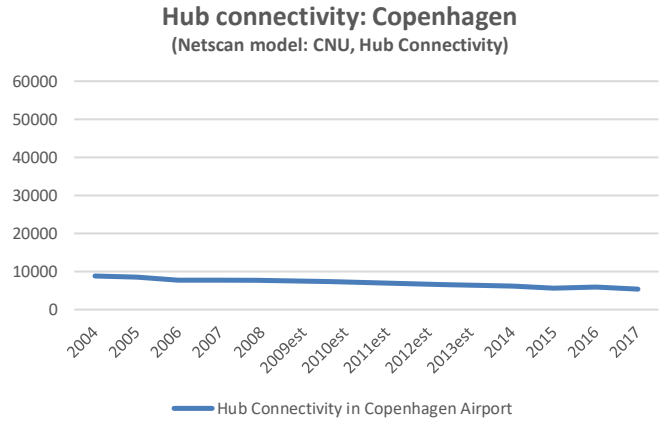

Capacity at airports in Denmark
(Departing seats in millions)
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
CPH
BLL
AAL
AAR
RNN
KRP
SGD
EBJ
RKE


Largest Danish airports and Top5 airlines
(Ratios, (Departing seats 2017)
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
SK
DY
FR
U2
LH
Other
FR
KL
LH
SK
BA
Other
DY
SK
KL
BA
FR
Other
Copenhagen
Billund
Aalborg


Destinations served from Denmark
(Departing seats in millions)
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Domestic
Europe
Longhaul


Destinations from Copenhagen
(Departing seats in millions, 2017)
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
United Kingdom
Norway
Germany
Sweden
Spain
Other
North America
Middle east
Asia
Other
Domestic
Europe
Long haul


Airport connectivity: Copenhagen
(Netscan model: CNU, Airport connectivity: Direct + Indirect)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Airport Connectivity
Direct Connectivity
Indirect Connectivity


Hub connectivity: Copenhagen
(Netscan model: CNU, Hub Connectivity)
60000
50000
40000
30000
20000
10000
0
2004
2005
2006
2007
2008
2009est
2010est
2011est
2012est
2013est
2014
2015
2016
2017
Hub Connectivity in Copenhagen Airport

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